Reduced Vertical Separation Minimum

ATC Manual

General RVSM information for the air traffic community and user groups

DRVSM Air Traffic Implementation Guide

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SECTION 1. INTRODUCTION

1-1. Purpose of This Manual

The purpose of this manual is to provide a source of information on domestic U.S. and Offshore RVSM programs. (FAA controlled Offshore airspace is discussed below). The manual also provides related information on RVSM programs in Canada and Mexico. It is intended to be used by air traffic control planners, managers and controllers and by the aviation industry including aircraft operators. It provides background and history as well as operational policies and procedures.

1-2. Applicability of the Policies and Procedures in This Manual

The policies, guidance and direction in this notice apply to RVSM operations in the airspace over the lower 48 states, Alaska, Atlantic and Gulf Of Mexico High Offshore Airspace and airspace in the San Juan FIR where VHF or UHF voice direct controller-pilot communication (DCPC) is normally available. Policies, guidance and direction for RVSM operations in oceanic airspace where VHF or UHF voice DCPC is not available and the airspace of other countries are posted on the FAA "RVSM Documentation" Webpage at http://www.faa.gov/ats/ato/rvsm_documentation.htm.

1-3. Definition/Explanation of Reduced Vertical Separation Minimum (RVSM)

1,000 feet vertical separation has been applied up to Flight Level (FL) 290 on a global basis for approximately 40 years. Until the RVSM program was implemented in North Atlantic oceanic airspace in March 1997, 2,000 feet vertical separation was applied to all FL's at/above FL 290. The special provisions of the RVSM program explained below enable 1,000 feet vertical separation to apply safely between FL 290 – 410 (inclusive).

1-4. Status of Global RVSM Implementation

RVSM is a global program. It was first implemented in North Atlantic Minimum Navigation Performance airspace in March 1997. The table below shows the status of RVSM implementation in various regions of the world since that date. Figure 1-4 shows global airspace where RVSM has been or is planned to be implemented.

Area of Operations	Implementation Dates	Flight Levels
North Atlantic MNPS (Minimum Navigation Performance Specification) Airspace	March 1997 October 1998 January 2002	FL 330-370 FL 310-390 FL 290-410
Pacific Oceanic Airspace	February 2000 January 20, 2005	FL 290-390 FL-290-410
Australia	November 2001	FL 290-410
Western Atlantic Route System	November 2001 January 2002	FL 310-390 FL 290-410
All European Airspace	January 2002	FL 290-410
Western Pacific/South China Sea	February 2002	As published
Northern Canada	April 2002	FL 290-410
Middle East and Asia South of the Himalayas	November 2003	As published
Domestic United States, Southern Canadian Domestic Airspace, Caribbean, and South America	January 20, 2005	FL 290-410

Figure 1-4A

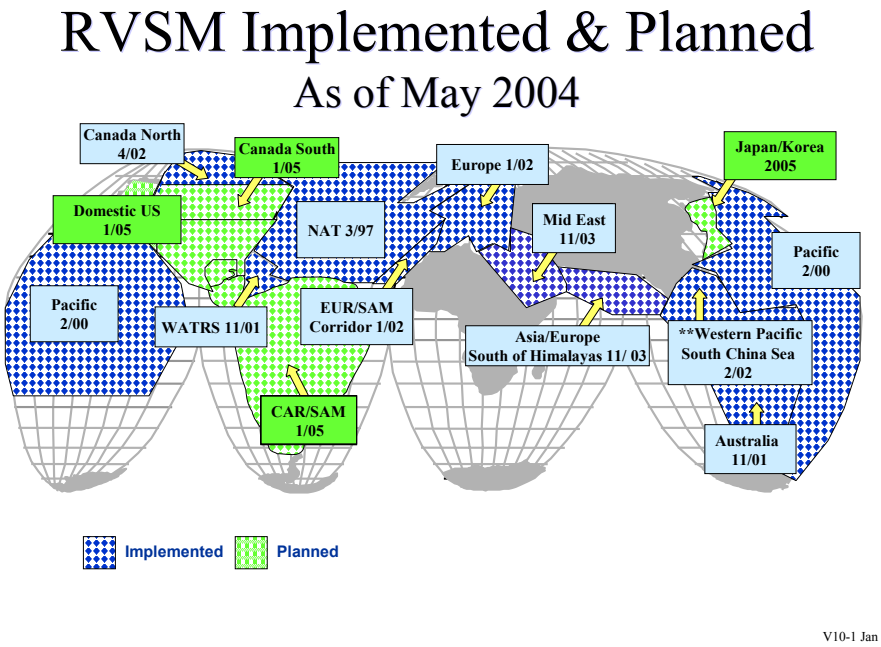

Figure 1-4B

A. 1-5. Domestic U.S. RVSM (DRVSM) Implementation: Date/Time And Areas Mandate. At 0901 UTC on January 20, 2005, the FAA will implement RVSM between FL 290-410 (inclusive) in the airspace of the:

1. Lower 48 states of the United States and Alaska
2. Atlantic and Gulf of Mexico High Offshore Airspace (including Miami and Houston Oceanic)
3. San Juan Flight Information Region (FIR).

> ✈ There are many references to DRVSM and to RVSM in this and other documents. DRVSM refers to the Program, RVSM refers to the change to the vertical separation minimum from FL290 through FL410.

B. To provide a seamless environment for aircraft operating across borders in North and South America, RVSM is also planned to be introduced on the same date in:

1. Southern Canadian Domestic Airspace
2. Mexico
3. The Caribbean Region and…
4. South America

> ✈ There have been numerous meetings held with aviation representatives of the Governments of Canada, Mexico, Caribbean States, and other South American organizations to develop international agreements. Items considered for consistency among the implementing countries were procedural development, consistency of training, automation changes, etc. Additionally, there have been meetings between operational controller groups of the abutting control facilities to develop the procedural requirements for implementing RVSM.

1-6. Sources of Information: FAA RVSM Websites

Information on RVSM and DRVSM programs can be found on the FAA RVSM Website. The RVSM Homepage address is www.faa.gov/ats/ato/rvsm1.htm. The DRVSM and RVSM Documentation WebPages are linked to the Homepage. The RVSM Documentation Webpage provides documents and guidance for operators and FAA inspectors on aircraft and operator approval for RVSM operations.

1-7. Requirement for Authorization to Operate in RVSM Airspace

In accordance with Title 14 of the Code of Federal Regulations (14 CFR) Section 91.180, with only limited exceptions, prior to operating in RVSM airspace, operators and aircraft must have received RVSM authorization from the responsible civil aviation authority. (See Section 1-10, paragraph B.). If the operator or aircraft or both have not been authorized for RVSM operations, the aircraft will be referred to as a "Non-RVSM" aircraft. Section 3-3 provides ATC policies for accommodation of Non-RVSM aircraft flown by the Department of Defense, Air Ambulance (Lifeguard) operators, foreign State (country) and manufacturer aircraft being flown for certification and development. Section 4-5 contains policies for Non-RVSM aircraft climbing to and descending from FL 430 or above.

1-8. RVSM Benefits and Objectives

A. Statement of the Problem. Air traffic levels were reduced following the events of September 11, 2001. Air traffic, however, has resumed the steady increase that has been exhibited in past years. Air traffic at FAA air route traffic control centers is projected to increase over the next ten years at an average annual rate of 1.5 percent. By 2012, FAA air route traffic control centers are projected to be required to manage approximately 9 million more instrument flight rule (IFR) flights than they did in 2000 (55.0 million versus 46.0 million).

As air traffic increases, the opportunity for aircraft to fly the desired time and fuel-efficient flight levels and routes will be significantly diminished. In addition, traffic increases will diminish the capability of the FAA to move aircraft through and around areas affected by significant weather systems. In areas characterized by high-density traffic, the FAA may be required to invoke restrictions that can result in traffic delays and fuel penalties.

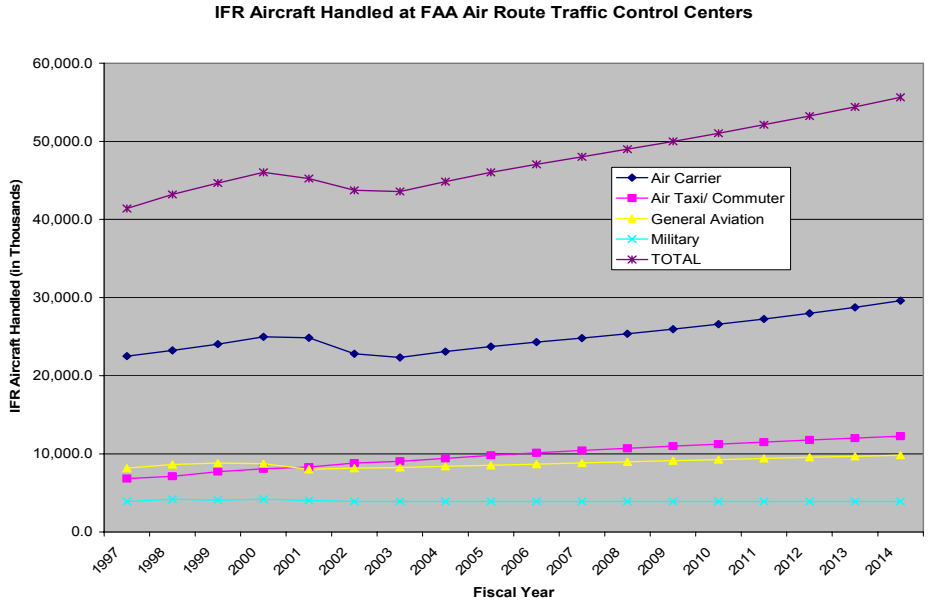

Figure 1-8A

B. National Airspace System Operational Evolution Plan (NAS OEP) Initiatives. In 2001, the FAA began a focused study of initiatives to enhance the efficiency and reliability of air traffic operations in the NAS. This study and inputs from the airspace user community has led the FAA to pursue a variety of options and initiatives to enhance airport capacity and arrival, approach, and en route operations. The initiatives and FAA plans to pursue them are published in the NAS OEP. The website address for this document is: www.faa.gov/programs/oep.

The FAA considers the option to implement RVSM in the NAS to be a high priority initiative because RVSM has proven over the past several years to provide significant enhancements to en route operations in other areas. The RVSM implementation project is listed in the En route Congestion Solutions section of the NAS OEP.

C. Advocacy by User Groups. Organizations and representatives from the aviation community have advocated the implementation of RVSM in U.S. and Gulf of Mexico airspace. The U.S. operators view RVSM as a proven operational program that can mitigate some of the problems encountered in U.S. domestic operations.

D. RVSM Mitigation of Air Traffic Management Problems. With air traffic levels increasing annually, FAA airspace planners and their international counterparts have established programs to implement RVSM as a primary measure to enhance air traffic management and operating efficiency. RVSM has been successfully implemented in both oceanic and continental airspace. The RVSM program has been implemented in oceanic airspace in the North and South Atlantic, the Pacific, the South China Sea, and in the portion of the West Atlantic Route System (WATRS) that is in the New York Oceanic Flight Information Region (FIR). The RVSM program has also been implemented in the continental airspace of Australia and Europe.

The RVSM program allows the vertical separation standard that is applied below FL 290 to be applied between FL 290 and 410. The 2,000-foot minimum vertical separation restricts the number of flight levels available. Flight levels 310, 330, 350, 370, and 390 are flight levels at which aircraft operate most economically. During peak periods, these FL's can become congested. When all RVSM FL's (FL 290-410) are utilized, six additional flight levels are available: FL's 300, 320, 340, 360, 380, and 400. Increasing the number of FL's available in the U.S. domestic airspace is projected to provide enhancements to aircraft operations similar to those gained in the North Atlantic (NAT) and Pacific (PAC) (i.e., mitigation of fuel penalties attributed to the inability to fly optimum altitudes and tracks and enhanced controller flexibility for air traffic management).

E. Benefit/Cost Analysis and Operational Benefits

1. *Benefit/Cost Analysis*. As part of the rulemaking process for domestic U.S. RVSM, the FAA conducted a benefit/cost analysis. Benefits were projected to exceed costs by a ratio of more than 6:1. Estimated benefits, based on fuel savings for the civil aircraft fleet over the years 2005 to 2016 were estimated to be $5.3 billion. Estimated operator costs were $869.2 million for the fifteen-year period 2002-2016. For the purposes of this cost analysis, the FAA assumed that operators would choose to upgrade all of their aircraft to meet RVSM standards. Operators of non-RVSM aircraft would, however, retain the option of flying above or below RVSM airspace.

2. *Operational Benefits*. Implementation of a 1,000-foot vertical separation standard above FL 290 also offers substantial operational benefits to operators, including:

a. Greater availability of the most fuel-efficient altitudes. In the RVSM environment, aircraft are more likely to receive their requested altitude enabling them to consistently fly closer to their most fuel efficient FL.

b. Greater availability of the most time and fuel-efficient routes. Operators may not be cleared on the route that was filed due to demand for the optimum routes and resultant traffic congestion on those routes. The RVSM program allows the FAA to accommodate a greater number of aircraft on a given track or route. More time and fuel-efficient tracks or routes would therefore be available to more aircraft.

c. Increased air traffic controller flexibility. The RVSM program gives the FAA greater flexibility to manage traffic by increasing the number of flight levels available on each track or route. This enhanced flexibility is especially desirable in situations where the FAA must re-route traffic around weather.

d. Reduction of air traffic controller workload. The enhanced flexibility described above will reduce controller workload and allow them to work more efficiently.

e. Enhanced flexibility to allow aircraft to cross intersecting routes. The RVSM program makes more flight levels available to enable aircraft to cross intersecting flight paths above or below conflicting traffic.

✈ The six new altitudes immediately available on January 20, 2005, provide a new "capacity" for solving separation problems and for traffic growth. The growth in air traffic is inevitable and these additional altitudes will be of benefit with that growth in the en route environment, other system constraints, e.g. available runway capacity, remain a capacity limitation.

1-9. Development of RVSM Programs

A. Rising traffic volume and fuel costs, which made flight at fuel-efficient altitudes a priority for operators, sparked an interest in the early 1970's in implementing RVSM above FL 290. In April 1973, the Air Transport Association of America (ATA) petitioned the FAA for a rule change to reduce the vertical separation minimum to 1,000 feet for aircraft operating above FL 290. The petition was denied in 1977 in part because (1) aircraft altimeters had not been improved sufficiently, (2) improved maintenance and operational standards had not been developed, and (3) altitude correction was not available in all aircraft. In addition, the cost of modifying nonconforming aircraft was prohibitive. The FAA concluded that granting the ATA petition at that time would have adversely affected safety.

B. Forums for Development of RVSM Policy and Procedures
The FAA recognized, however, the potential benefits of RVSM and in the 1980's, focused its efforts and resources on establishing the criteria and policies that would allow RVSM to be implemented safely. In conjunction with this effort, the FAA also considered the economic feasibility of RVSM. These efforts were considered in the following national and international forums.

1. *FAA Vertical Studies Program*. This program began in mid-1981, with the objectives of collecting and analyzing data on aircraft performance in maintaining assigned altitude, developing program requirements to reduce vertical separation, and providing technical and operational representation on the various working groups studying the issue outside the FAA.

2. *RTCA Special Committee (SC)-150*. RTCA, Inc., (formerly Radio Technical Commission for Aeronautics) is an industry organization in Washington, D.C., that addresses aviation technical requirements and concepts and produces recommended standards. When the FAA hosted a public meeting in early 1982 on vertical separation, it was recommended that RTCA be the forum for development of minimum system performance standards for RVSM. RTCA SC-150 was formed in March 1982 to develop minimum system performance requirements, identify required

improvements to aircraft equipment and changes to operational procedures, and assess the impact of the requirements on the aviation community. RTCA SC-150 served as the focal point for the study and development of RVSM criteria and programs in the United States from 1982 to 1987, including analysis of the results of the FAA Vertical Studies Program.

3. *International Civil Aviation Organization (ICAO) Review of the General Concept of Separation Panel (RGCSP).* In 1987, the FAA concentrated its resources for the development of RVSM programs in the ICAO RGCSP. The U.S. delegation to the ICAO RGCSP used the material developed by RTCA SC-150 as the foundation for U.S. positions and plans on RVSM criteria and programs. The panel's major conclusions were:

a. RVSM was technically feasible without imposing unreasonably demanding technical requirements on the equipment.

b. RVSM would provide significant benefits in terms of economy and enroute airspace capacity.

c. Implementation of RVSM on either a regional or global basis required sound operational judgment supported by an assessment of system performance based on: aircraft altitude-keeping capability, operational considerations, system performance monitoring, and risk assessment.

d. The RGCSP developed the ICAO Manual on Implementation of a 300-meter (1,000-foot) Vertical Separation Minimum Between FL 290 and FL 410 (inclusive)(ICAO Document 9574) that was published in 1992. This document provided the FAA with the basis for: the development of detailed aircraft and operator approval documents, planning for required RVSM implementation tasks, and developing programs to monitor aircraft performance and system safety.

4. *North Atlantic System Planning Group (NATSPG) and the NATSPG Vertical Separation Implementation Group (VSIG).* After developing and reviewing cost/benefit studies, the NATSPG (of which the FAA is a member) concluded in 1991 that RVSM should be implemented in North Atlantic Minimum Navigation Performance Specification airspace and that working groups and programs should be established to implement it in 1996-1997. The NATSPG, thus, became the first ICAO regional group to develop the technical and operational programs to implement RVSM.

a. To pursue implementation, the NATSPG established the VSIG in June 1991 to take the necessary actions to implement RVSM in the NAT. These actions included:

(1) Aircraft and Operator Approval. The Operations and Airworthiness Group (chaired by the FAA) developed a detailed document containing the criteria and process to approve aircraft and operators for RVSM operations. The document addressed issues related to aircraft airworthiness, maintenance, and operations. The ICAO regional implementation groups and civil aviation authorities world-wide have adopted this document as the basis for aircraft airworthiness and operations programs.

(2) Safety Analysis and Monitoring Aircraft Altitude-keeping performance. The VSIG provided the forum to develop criteria and process for safety analysis and for the development and use of two different, but complementary, monitoring systems to assess aircraft altitude-keeping in-service performance. These systems are the ground-based Height Monitoring Unit (HMU) and the Global Position System Monitoring System

(GMS). The NATSPG used these systems to observe the performance of individual airframes and groups of aircraft with the objective of confirming that the approval process was uniformly effective and that the airspace system was safe.

(3) Air Traffic Policy and Procedures. The NATSPG Air Traffic Management Group developed ATC procedures for RVSM, conducted simulation studies to assess the effect of RVSM on ATC, and developed documents to address ATC issues.

Policy, procedures and documents developed in the NATSPG forum are used as the basis for RVSM program implementation worldwide.

1-10. Safety Observed in RVSM Operations

A. Application of 1,000-foot Vertical Separation Below FL 290. Before discussing the safety observed in the application, since March 1997, of 1,000-foot vertical separation at and above FL 290, it is important to note that 1,000-foot vertical has been applied safely below FL 290 for over 40 years. The 1,000-foot vertical separation of aircraft below FL 290 is an ICAO separation standard and since the 1960's, it has been applied below FL 290 worldwide, including in the U.S. The RVSM program enables the use of 1,000-foot vertical separation to be expanded above FL 290 to FL 410.

1. Regulations: Criteria for Aircraft and Operator Approval

a. Part 91, Section 91.180 (Operations within airspace designated as RVSM airspace), Section 91.706 (Operations within airspace designed as RVSM Airspace) and part 91, Appendix G (Operations in RVSM Airspace) contain the FAA requirements for aircraft and operator approval to conduct RVSM operations. (Section 91.180 applies to RVSM operations within the U.S. Section 91.706 applies to U.S. operators conducting RVSM operations outside the U.S.).

b. The aircraft and operator approval requirements published in part 91, Appendix G, and European Joint Airworthiness Authorities (JAA) RVSM documents was developed in a joint FAA/JAA working group. In that group, technical and operational experts from the FAA, the European Joint Airworthiness Authorities (JAA), the aircraft manufacturers, and pilot associations developed detailed criteria and procedures for RVSM approval using the ICAO RVSM Manual (Doc 9574) as the starting point. These FAA and JAA regulations and standards have been used worldwide for RVSM aircraft and operator approval.

c. Sections 91.180 and 91.706 require that aircraft and operators meet the standards of Appendix G and receive authorization from the appropriate authority prior to flying in airspace where RVSM is applied. Appendix G contains requirements in eight sections:

(1) Definitions
(2) Aircraft Approval
(3) Operator Authorization
(4) RVSM operations (flight planning into RVSM airspace)
(5) Deviation Authority Approval
(6) Reporting Altitude-keeping Errors
(7) Removal or Amendment of Authority
(8) Airspace Designation

d. The criteria and procedures published in FAA Appendix G and in JAA and ICAO documents have produced aircraft performance that is significantly better than the minimum required for safety in the ICAO RVSM Manual.

2. Observed Altitude-Keeping Performance

a. Since 1996, the FAA, in conjunction with other civil aviation authorities, has evaluated (or monitored) the altitude-keeping performance of RVSM approved aircraft. The GMS and the ground-based HMU have been used to observe aircraft performance in both oceanic and continental airspace.

b. Altimeter system error (ASE) is the major component of aircraft altitude-keeping performance. The ASE is the difference between the pressure altitude displayed on the altimeter (assuming a correct altitude barometric setting) and the true pressure altitude.

c. Measurements have shown that the altitude-keeping performance of the population of aircraft approved for RVSM operations is significantly better than the minimum requirement established by the ICAO RGCSP in the ICAO RVSM Manual. The ICAO RVSM Manual calls for average or mean ASE for groups of aircraft not to exceed 80 feet and 99.9% of ASE measurements not to exceed 245 feet.

1-11. RVSM Safety Analysis

Over the past several years, the on-going assessment of RVSM risk in various areas worldwide has shown that operational safety is maintained. All sources of aircraft, pilot, and controller error in RVSM operations have been assessed using safety analysis processes. The FAA and other civil aviation authorities have concluded that RVSM operations are safe.

1-12. Safety Analysis and Monitoring of Altitude-keeping Performance in the Pre-and Post Implementation Phases

A. Necessity for Monitoring Programs. DRVSM implementation would require RVSM standards to be applied to the thousands of aircraft and operators that operate above FL 290 in domestic airspace. In order to assess the uniform effectiveness of aircraft and operator actions and identify adverse trends that may arise, the FAA would establish a DRVSM monitoring program similar to those established for oceanic RVSM implementation.

B. Monitoring Experience. The altitude-keeping performance of RVSM approved aircraft has generally been significantly better than the minimum required by RVSM standards, however, in the past five years of RVSM operations, a few individual airframes and aircraft groups have demonstrated altitude-keeping that has not met RVSM standards. A major purpose of monitoring is to identify performance that does not meet RVSM standards and, when necessary, to ensure that operators and/or manufacturers take appropriate corrective actions.

C. Justification for Sampling Process and Monitoring After Approval Granted.
Altitude-keeping performance monitoring began in 1996. Since that time, the FAA and other authorities responsible for monitoring have obtained hundreds of thousands of measurements for thousands of individual airframes and over 80 individual aircraft types. To date very few individual airframes have been observed exhibiting performance that do not meet RVSM standards. In addition, altimetry system error for the aircraft population as a whole has been demonstrated to be significantly better than the minimum standards. These results have given the FAA and other authorities confidence in RVSM aircraft engineering processes. Based on the monitoring results, authorities have adopted the position that monitoring may take the form of a sampling of newly approved airframes and, for most aircraft, it was not necessary for operators to complete monitoring prior to RVSM operating authority being granted.

D. Systems Developed to Monitor Aircraft Performance.
Three systems have been deployed to perform monitoring for RVSM purposes. Two systems have been used since 1996: the ground-based Height Monitoring Unit (HMU) and the GPS-based Monitoring Unit (GMU). The third system is the Aircraft Geometric Height Measurement Element (AGHME).

1. HMU's are placed in strategic locations in Canada, the UK and Europe so that a large percentage of flights will be observed. Three to five AGHME units are being deployed by the FAA in the U.S. and two in Canada for the same purpose. Only aircraft that fly within proximity to HMU or AGHME locations can be observed.

To obtain performance measurements with the GMU system, a GMU unit is temporarily installed, in accordance with appropriate certification documents, on an aircraft for a flight. The unit contains a GPS to obtain the geometric height of the aircraft in flight. This data is processed after the flight by the FAA Technical Center to obtain measurement of ASE, Total Vertical Error (TVE) and Assigned Altitude Deviation (AAD).

2. Operators have had and will have the options of over-flying an AGHME or HMU at no cost or contracting for service to have the GMU installed on the aircraft and data processed.

3. The "Monitoring Requirements and Procedures" section of the FAA RVSM Documentation Webpage contains information on monitoring program processes and procedures.

E. Pre-implementation Programs
In the period leading to RVSM implementation, operators will begin to obtain RVSM airworthiness approval for aircraft that have not already been approved for RVSM. During this period, the FAA will review aircraft operations with the overall objectives of:

1. Confirming that operators are conducting RVSM operations safely.
2. Confirming through observation (monitoring) that aircraft approved for RVSM operation demonstrate altitude-keeping performance that meets RVSM standards. This will be achieved by:

a. Identifying and eliminating any causes of out-of-tolerance altitude-keeping performance, in general or for specific aircraft groups; and

b. Monitoring a sample of RVSM-approved aircraft and operators that is representative of the total population.

3. Verifying that operational procedures adopted for RVSM are effective and appropriate.
4. Confirming that the altitude-monitoring program is effective.

Post Implementation Programs.

After DRVSM is implemented, the FAA will continue to:

1. Collect altitude-keeping performance data relying primarily on the ground-based and GPS based monitoring systems.

2. Monitor to confirm that safety goals outlined in ICAO Guidance Materials for RVSM are being met.

3. Monitor to establish that there are no unresolved adverse trends in DRVSM operations.

1-13. TCAS Role in RVSM

A. A significant majority of the aircraft that operate in the domestic U.S. at and above flight level 290 are required to be equipped with TCAS II. Requirements for aircraft TCAS equipage are published in 14 CFR parts 121, 125, 129 and 135. Approximately 85% of domestic operations above FL 290 are conducted by jet aircraft operating under parts 121, 129 or 135.

B. Part 91, Appendix G, section 2, paragraph (g) states that "after March 31, 2002, unless otherwise authorized by the Administrator, if you operate an aircraft that is equipped with TCAS II in RVSM airspace, it must be a TCAS II that meets TSO C-119b (Version 7.0), or a later version." This provision was adopted because Version 7.0 incorporates Traffic Alert and Resolution Advisory thresholds that mitigate unnecessary alerts when 1,000-foot vertical separation is applied above FL 290. Version 7.0 generally requires a software modification that is not a major system modification. The cost for this modification has been accounted for in the cost/benefit analysis. Operators of aircraft equipped with TCAS II must consider this provision when planning for DRVSM implementation on January 20, 2005.

1-14. Conclusion

The FAA has examined the success of existing RVSM programs, the costs and benefits for DRVSM implementation, the measures to be taken to protect operational safety, the factors bearing on the implementation schedule and implementation scenario and the factors related to aircraft and operator approval and air traffic programs. The FAA will implement RVSM between FL 290-410 (inclusive) on January 20, 2005.

SECTION 2. DESCRIPTION OF AIRSPACE

RVSM Mandate. When airspace is designated as RVSM airspace, aircraft and operators are restricted from operating in that airspace (with only limited exceptions) unless they are authorized by the responsible civil aviation authority to conduct RVSM operations.

2-1. Domestic United States (U.S.), Canada and Mexico: RVSM Airspace

A. At 0901 UTC on January 20, 2005, RVSM airspace will be implemented:

1. Between FL 290-410 (inclusive)

B. In the airspace of the:

1. Lower 48 states of the United States and Alaska
2. Atlantic and Gulf of Mexico High Offshore Airspace (including Miami and Houston Oceanic)
3. San Juan Flight Information Region (FIR)
4. Southern Canadian Domestic Airspace (RVSM is already in use in Northern Canadian Domestic Airspace)
5. Mexico (including the oceanic FIR's where Mexico provides ATS).

C. To provide a seamless environment for aircraft operating across borders in North and South America, RVSM is also planned to be introduced on the same date in:

1. The Caribbean Region
2. South America

2-2. RVSM Implementation in Oceanic Flight Information Regions (FIR) Where the FAA Provides ATS

A. RVSM is currently mandated in the following FIR's where the FAA provides ATS:

1. New York Oceanic FIR (including the New York FIR portion of the West Atlantic Route System) between FL 290-410(inclusive)
2. *Oakland Oceanic FIR between FL 290-390 (inclusive).
3. *Anchorage Oceanic FIR between FL 290-390(inclusive)

*On January 20, 2005, RVSM airspace will be expanded in Oakland and Anchorage Oceanic airspace from FL290-390 to FL290-410 (inclusive).

2-3. Transition Airspace

At 0901 UTC on January 20, 2005, airspace previously designated as "transition airspace" will become RVSM airspace, with the possible exception of some airspace within the Pacific Region that would remain transition airspace. When RVSM was implemented in FAA controlled oceanic airspace, certain Offshore and domestic airspace adjoining that airspace was designated as transition airspace. Transition airspace has been used to move aircraft to the correct FL prior to entry into oceanic RVSM airspace and, for aircraft exiting RVSM airspace, moving aircraft to the correct FL for operation in domestic airspace where conventional vertical separation is applied.

SECTION 3. FLIGHT PLANNING AND COORDINATION

3-1 Introduction

Starting at 0901 UTC, January 20, 2005, ATC will use the flight plan equipment block information to determine whether to issue or to deny clearance into RVSM airspace. In addition, ATC will use that information to determine when a 2,000 foot vertical separation minimum needs to be applied to an aircraft because it is not RVSM-compliant. The operator annotates the equipment block of the FAA Flight Plan (FAA Form 7233-1) or the ICAO Flight Plan with a designated letter to inform ATC whether or not the operator has received authorization to fly the aircraft in RVSM airspace. (Block 3 on the FAA Flight Plan is "Aircraft Type/Special Equipment").

3-2. Flight Planning Into DRVSM Airspace

A. **Operators that do not file the correct aircraft equipment suffix on the FAA or ICAO Flight Plan may be denied clearance into RVSM airspace.** Policies for the FAA Flight Plan are detailed in paragraph B below. Policies for the ICAO Flight Plan are detailed in C.

B. FAA Flight Plan (FAA Form 7233-1). The revised Aircraft Equipment Suffix Table can be found in the FAA Notice, "Revised Aircraft Equipment Suffix Table For FAA Flight Plans", attached to this manual. It will also be posted in Chapter 5, Section 1 (Pre-flight) of the Aeronautical Information Manual on February 17, 2005. It will allow operators to indicate both RVSM and Advanced Area Navigation (RNAV) capabilities when filing an FAA Flight Plan. The table revises the definition of "/Q" and eliminates the prohibition of users filing "/Q" in block 3 of the FAA Flight Plan (Aircraft Type/Special Equipment). "/Q" will indicate that the aircraft has both RVSM and Advanced RNAV capabilities. (/Q = RVSM **plus** /R **or** /E **or** /F **or** /G). "/W" only indicates RVSM authorization.

1. The policies for operator use of the revised Aircraft Equipment Suffix Table attached to this notice will be followed. The FAA objective is to enable operators to better indicate aircraft Advanced RNAV and RVSM capabilities in progressive phases. The phases are detailed below:

Note: Oakland/Anchorage Oceanic CTA/FIR. As shown in the attached Aircraft Equipment Suffix Table, in all phases, aircraft filing "/Q" to operate in Oakland and/or Anchorage Oceanic CTA/FIR's must be authorized for RVSM and Required Navigation Performance 10 (RNP-10) or better (e.g., RNP-4).

a. Phase 1. Effective **November 25, 2004**, operators **may begin** filing "/Q" in the FAA Flight Plan under the following conditions:

(1) The operator and aircraft are RVSM-compliant and have Advanced RNAV capabilities, and
(2) The FAA Flight Plan is filed directly to the HOST Computer System (HCS).

Operators are not required to use "/Q" in Phase 1.

Note: Operators filing through DUATS and some Flight Service Stations may not file "/Q" until January 20, 2005.

b. Phase 2. Effective **January 5, 2005**, with the exception of operators filing through DUATS and Flight Service Stations, operators/aircraft that are RVSM-compliant **are expected to** file "/Q" or "/W", as appropriate, for flights between FL 290-410 (inclusive).

This will allow the FAA to see that operators are filing correctly for flight in RVSM airspace as the implementation date approaches.

c. Phase 3. Effective **January 20, 2005** at 0901 UTC, **all** operators/aircraft that are RVSM-compliant are **required** to file "/Q" or "/W", as appropriate, in the FAA Flight Plan for flights between flight level (FL) 290-410, inclusive. This includes operators filing through DUATS and Flight Service Stations.

d. Phase 4. In September 2005, the FAA plans to implement additional aircraft equipment suffixes. The additional suffixes will enable the operator to identify more specific Advanced RNAV capabilities. The FAA will publish information on this revision in a separate Notice.

2. Other Equipment Suffix Table Changes. Wide Area Augmentation System (WAAS) is added to "/G" and clarifying wording is added to "/ R".

3. Important Note: The suffixes, as defined in the revised table will be available for operator use effective November 25, 2004, however, as noted above, **the Aeronautical Information Manual will not be updated until the February 17, 2005 edition.**

4. Policies for Use of the FAA Flight Plan Equipment Suffix.

a. Operators can only file one equipment suffix in block 3 of the FAA Flight Plan. Only this equipment suffix is displayed directly to the controller.

b. If the operator or aircraft has not been authorized to conduct RVSM operations, "/W" or "/Q" will not be filed. This is in accordance with 14 CFR Part 91 Appendix G, Section 4. The appropriate equipment suffix from the Aircraft Equipment Suffix Table will be filed instead.

c. Aircraft with RNAV Capability. For flight in RVSM airspace, aircraft with RNAV capability, but not Advanced RNAV capability, will file "/W". Filing "/W" will not preclude such aircraft from filing direct routes or RNAV routes in enroute airspace.

C. Policy for ICAO Flight Plan Equipment Suffixes.

1. Operators/aircraft that are RVSM-compliant and that file ICAO flight plans will continue to file "W" in block 10 (Equipment) to indicate RVSM authorization and will also file the appropriate ICAO Flight Plan suffixes to indicate navigation and communication capabilities. **"/Q" is not an authorized ICAO equipment suffix and will not be filed in an ICAO flight plan.**

2. Effective **January 20, 2005**, operators/aircraft that file ICAO flight plans that include flight in Domestic U.S. RVSM airspace must file "/W" in block 10 to indicate RVSM authorization.

D. Importance of Flight Plan Equipment Suffixes. The operator must file the appropriate equipment suffix in the equipment block of the FAA Flight Plan (FAA Form 7233-1) or the ICAO Flight Plan. The equipment suffix informs ATC:

1. Whether or not the operator and aircraft are authorized to fly in RVSM airspace

2. The navigation and/or transponder capability of the aircraft (e.g., Advanced RNAV, Transponder with Mode C)

E. Significant ATC uses of the flight plan equipment suffix information are:

1. To issue or deny clearance into RVSM airspace

2. To apply a 2,000 foot vertical separation minimum in RVSM airspace to aircraft that are not authorized for RVSM, but are in one of the limited categories that the FAA has agreed to accommodate. (See paragraphs j and k for policy on limited operation of unapproved aircraft in RVSM airspace).

3. To determine if the aircraft has "Advanced RNAV" capabilities and can be cleared to fly procedures for which that capability is required.

3-3. Accommodation of NON-RVSM Aircraft

A. Introduction. RVSM airspace is exclusionary for RVSM aircraft. However, certain groups of non-RVSM aircraft are to be accommodated in RVSM airspace, if workload permits. These are called "exception aircraft". A non-RVSM exception aircraft that is accommodated requires 2,000 ft. vertical separation while in the RVSM airspace. Formation flights are considered non-RVSM and when they are joined in formation the controller needs to change the equipment suffix to a non-RVSM suffix for the duration of time the flight remains in formation. The types of non-RVSM aircraft that may be accommodated in RVSM airspace are:

1. DoD certified aircraft operated by the U.S. Government.
2. Lifeguard; active air ambulance aircraft utilizing a "Lifeguard' call sign.
3. Flights conducted for aircraft certification and development not yet certified for RVSM.
4. Foreign State aircraft; transporting a head of State, "open skies" flights etc.
5. Aircraft climbing/descending through RVSM airspace without leveling off at RVSM altitudes.

The accommodation of exception aircraft may have a significant system impact necessitating a process for tracking and coordinating these flights. Each facility must have an SOP to define the internal coordination and approval process. The SOP must define the process for logging denial/removal of non-RVSM aircraft to/from RVSM airspace and the TMU role.

- ✈ Air traffic controllers may not clear unauthorized aircraft into the airspace, even though they may be capable of accommodating the aircraft.

- ✈ Controller workload, airspace complexity and potential for error increase with an increase in the number of non-RVSM aircraft accommodated. This has been proven through the European experience and in the simulations at the FAA Technical Center.

B. Aircraft Access Options. There are three methods for operators to notify the FAA of their intention to operate non-RVSM in RVSM airspace. They are:

1. Enter into a Letter of Agreement (LOA)/Memorandum of Understanding (MOU) with the RVSM facility in which they intend to operate. Operators are expected to comply with the LOA/MOU. These should normally be for routine handling and/or transitioning to and from special use airspace (SUA) and/or air traffic control assigned airspace (ATCAA).

2. File-and-Fly. The operator files a flight plan to notify the FAA of their intention to request access to RVSM airspace.

3. Contact the FAA 60-240 minutes prior to departure to receive a conditional approval. This conditional approval is only a pre-coordination process. It is based on an estimate of conditions expected at the time of the non-RVSM aircraft entering RVSM airspace. Clearance into the airspace will be on a workload and traffic-permitting basis. **A conditional approval from the FAA does not constitute an ATC clearance nor does not obviate the need to file an IFR flight plan.**

C. Conditional Approval Coordination. All conditional approval requests must contain the following information:

- Aircraft Identification (Call sign in flight plan);
- Proposed Departure Time;
- Speed;
- Altitude;
- Route of Flight;
- Comments germane to the flight (e.g. VIPs on board);
- Operator Name and contact information

1. The operator may submit the information via the Internet at www.fly.faa.gov or file a flight plan or call the FAA 60-240 minutes prior to the proposed departure time. Flights that do not meet the time requirements will be handled as File-and-Fly. All data submissions must be followed up by a phone call to confirm the request. Flights will only be coordinated after receiving the phone call. If the flight remains within one or two Centers, the operator should contact the departure Center. If the flight traverses three or more Centers, or the flight will depart the US Flight Information Region, the operator must contact the David J. Hurley Air Traffic Control System Command Center (ATCSCC).

2. The departure Center is responsible for coordinating with the adjacent facility when two facilities are involved. If the information is supplied by the operator on the website, the coordinating facility may mandate that the receiving facilities utilize the Internet site to view the information for coordination purposes. At a future time, all approvals and disapprovals may be entered into the National Traffic Management Log (NTML), with the call sign. If the pilot verbally notifies the FAA or files a flight plan, and another facility is impacted, the departure facility must enter the data in the NTML for coordination purposes. Coordination within the facility is dependent on the facility Standard Operating Procedure (SOP). Once an aircraft leaves RVSM airspace, and is not requesting to return to RVSM airspace, normal handling of the aircraft is resumed.

D. Route and Altitude Changes. Pilot initiated altitude, and/or route changes (except minor deviations for weather) revert the flight's status to File-and-Fly. Any TMU notification of a flight's status or controller initiated changes will be covered in the facility SOP.

E. International Flights. International flights departing the U.S. are coordinated through the ATCSCC. For arrivals, the facility where the aircraft enters the U.S. will coordinate the flight. If the flight traverses three or more facilities, the ATCSCC is notified and completes the coordination.

F. Pilot Responsibilities. While airborne, the pilot has additional responsibilities for operating in the airspace. They must use the phrase "negative RVSM" when 1) queried by the controller to ascertain the RVSM approval status of the aircraft, 2) on the initial call on any frequency in RVSM airspace, 3) when requesting altitude changes in RVSM airspace, 4) when reading back altitude change clearances in RVSM airspace, and 5) when transitioning through RVSM airspace.

G. Controllers' role. The controllers' role is a tactical one. He/she makes the determination if the sector traffic permits accommodating an exception aircraft prior to accepting the handoff and coordinates with the next sector the aircraft will traverse.

H. Supervisor/CIC,s role. The supervisor/CIC's role is more strategic. He/she must ensure that the area's traffic situation, workload, and staffing can accommodate an exception aircraft before it is permitted to enter the area's airspace. A major consideration is the presence or projected appearance of other non-RVSM exception aircraft. He/she is required to provide advance notification of the exception aircraft to the next supervisor/CIC for the airspace the aircraft's route will take it through.

I. Specific roles and responsibilities. There are two distinct situations that will confront the controllers and the supervisors/CICs:

1. Non-RVSM aircraft requesting to **enter** RVSM airspace (initial request generally received directly from the pilot).

2. Non-RVSM aircraft **already in** RVSM airspace (generally received by the supervisor/CIC as a notification from the previous supervisor/CIC).

J. Controller responsibilities when a non-RVSM exception aircraft is requesting to **enter** RVSM airspace include:

1. If workload permits accommodation, advise the supervisor/CIC before issuing a clearance.

2. Wait for supervisor/CIC approval before issuing clearance.

3. Coordinate the aircraft with the next sector in a timely manner. A timely manner must allow for an alternate course of action should the next sector be unable to continue the accommodation.

4. Advise the supervisor/CIC of any altitude or route changes that would affect subsequent sectors.

5. If workload does not permit accommodation advise the supervisor/CIC of the denial.

K. Supervisor/CIC responsibilities when notified by a controller of a non-RVSM exception aircraft requesting to enter RVSM airspace include:

1. Determine if the area can accommodate the flight, i.e. traffic situation/volume, staffing, presence or projection of other non-RVSM exception aircraft being accommodated.

2. If the area can accommodate, coordinate with the next area/facility. This must be accomplished in sufficient time to allow for removing the aircraft from RVSM airspace if the next area or facility is unable to continue the accommodation.

3. Notify the controller of the decision and coordinate with each affected sector in the area. (Generally, before notifying the controller the supervisor should determine that the aircraft can be accommodated for the next 100-150 miles).

4. Should any route or altitude change affect the next area/facility, re-coordinate. Coordinate with TMU, as required by SOP.

5. Log any denial or removal to/from RVSM airspace as required by the SOP.

L. Supervisor/CIC responsibilities when being notified of a non-RVSM exception already in RVSM airspace is received from the prior area/facility include:

1. Determine if the area can accommodate the exception aircraft, i.e. traffic situation/volume, staffing, or presence/projection of other non-RVSM aircraft being accommodated.

2. If the area can accommodate the exception, coordinate with affected sectors and the next area/facility.

3. If any route or altitude change will affect the next area, re-coordinate with the next area/facility.

4. Coordinate with TMU as required by the SOP.

5. If the area cannot accommodate the exception, advise the prior area/facility of the denial.

6. Log any denial or removal to/from RVSM airspace as required by the SOP.

M. Controller responsibilities for handling exception aircraft already in RVSM airspace include:

1. Coordinate each non-RVSM exception aircraft with the appropriate sector in a timely manner. This coordination requirement is regardless of the supervisory advance notification.

2. Advise the supervisor/CIC of any route or altitude change that would affect subsequent sectors. A change in altitude or route could change which sectors the non-approved exception aircraft would enter.

3. Report any denial of RVSM airspace accommodation or removal to the supervisor/CIC as per the SOP and to insure logging of the event.

- Over the past four years the FAA has conducted eight Customer Seminars to assist operators to prepare for RVSM implementation. There have been a number of other presentations to specific groups such as National Business Aviation Association (NBAA) and General Aviation Manufacturers Association (GAMA) who represent those users that would make up the bulk of potential non-RVSM flights. There have been continuous meetings with the Department of Defense. At each of those briefings, seminars, and presentations the point has been well emphasized that non-RVSM accommodation is on a workload-permitting basis and they can expect to occasionally not be accommodated and in certain geographical areas and in certain timeframes there will frequently be no accommodation.
- While a significant amount of attention has been devoted to the non-RVSM aircraft in this and other FAA documents in the form of procedures, coordination, management, roles and responsibilities, it must be remembered we are speaking of a small number of aircraft and their accommodation is based on workload-permitting conditions.

N. Non-RVSM aircraft, other than those within the "exception" groups, may be permitted to transition to altitudes above or below RVSM airspace, workload permitting. These aircraft are not expected to follow pre-fight coordination procedures to obtain a conditional approval. Their action is to just file a flight plan. (See paragraph 4-5 for more detail). These aircraft shall only be leveled off

in climb or descent for separation purposes, not at the request of the user for any aircraft operational reason (frequent example – to burn off fuel). These transitioning aircraft require the vertical separation of 2,000 ft. while in RVSM airspace. It is anticipated that the volume of aircraft requesting this service will be very small. Several key requirements when accommodating non-RVSM, non-exception aircraft requesting this service are:

1. If the climb or descent can be accomplished within the originating sector, no sector-to-sector coordination is required but the controller must notify the supervisor/CIC for awareness purposes.

2. If the climb or descent will involve other sectors the controller must coordinate with the next sector in a timely manner and notify the supervisor/CIC for awareness purposes.

3. No coordination is required while the aircraft is above RVSM airspace, provided the aircraft is at an appropriate altitude for direction of flight.

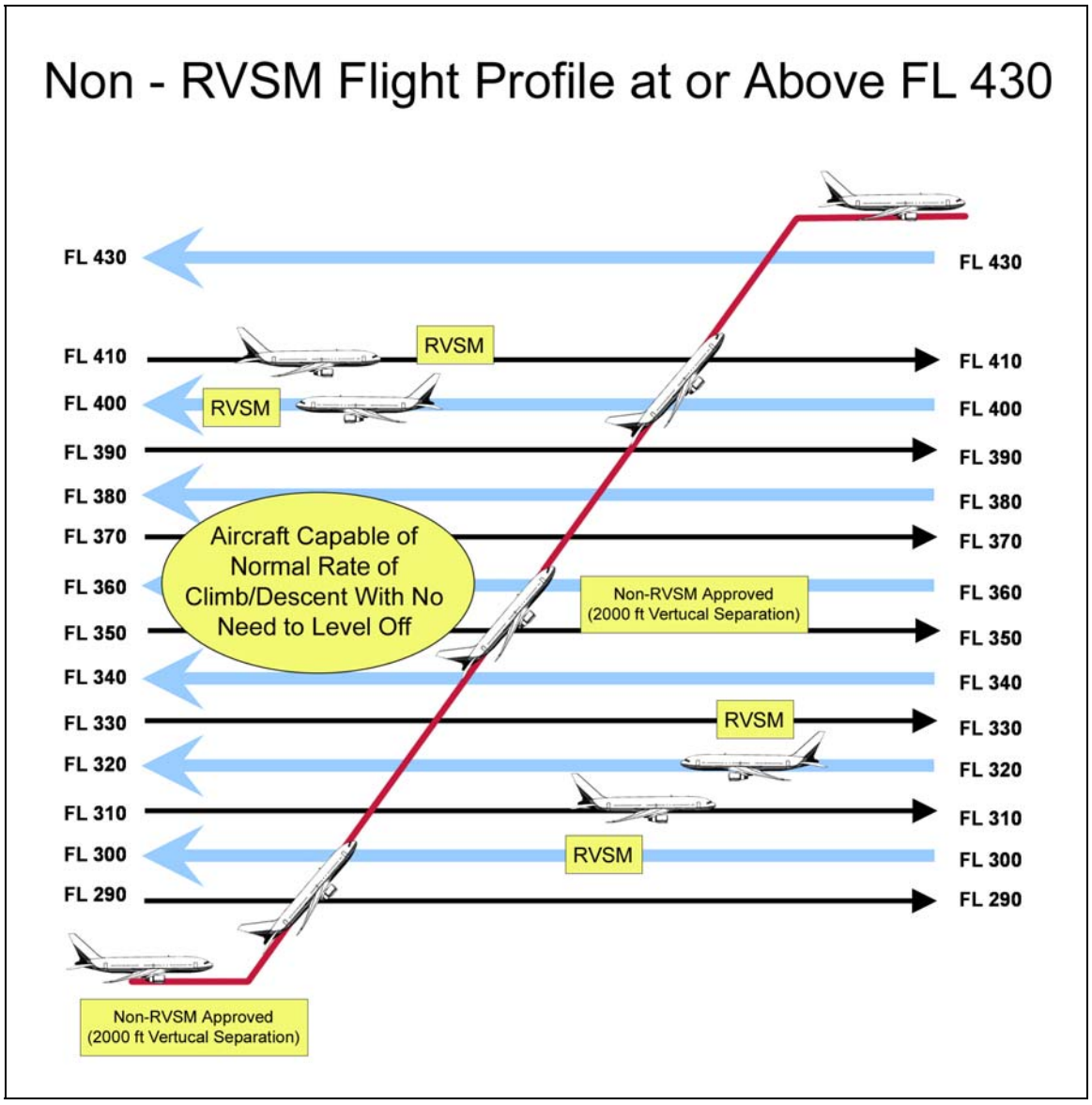

Figure 3-3

SECTION 4. FLIGHT OPERATIONS within RVSM AIRSPACE

4-1. RVSM OPERATIONS

During RVSM operations, controllers should be aware of several responsibilities associated with the operation. These include:

1. Notifying the operations supervisor of any non-RVSM aircraft requesting access to RVSM airspace.

2. Ensuring sector-to-sector coordination for all non-RVSM aircraft operations.

3. Ensuring non-RVSM aircraft are not permitted in RVSM airspace unless they meet the criteria of exception aircraft, which includes DoD, Lifeguard, manufacturer aircraft being flown for development/certification, foreign state aircraft, and aircraft transitioning through RVSM airspace. These exceptions are accommodated on a workload or traffic-permitting basis.

4. Ensuring the appropriate separation standards are applied and that any aircraft is removed from RVSM airspace that advises it has lost RVSM capability due to equipment while en route.

5. Using "negative RVSM" in all verbal ground-to-ground communications involving non-RVSM aircraft while cleared to operate within RVSM airspace.

NOTE: The operations supervisor/CIC and the STMC are responsible for system acceptance of a non-RVSM aircraft beyond the initial sector-to-sector coordination following the pilot request to access RVSM airspace

4-2. Vertical Separation

A. Separation of instrument flight rules (IFR) aircraft in RVSM airspace will use the following minima:

1. Up to and including FL 410 - 1,000 feet.
2. 2,000 feet at or above FL 290 between Non-RVSM aircraft and all other aircraft at or above FL 290.

B. It should be noted that aircraft operating in a formation flight are considered Non-RVSM aircraft regardless of their single-ship status.

> ✈ Controllers need to modify the equipment suffix when equipped aircraft join in formation to reflect the flight as non-RVSM. Upon breakup, if the formation aircraft remain in RVSM airspace the equipment suffix needs to again be modified to reflect the aircraft as RVSM.

C. Separate aircraft in RVSM airspace from special use airspace (SUA) by 1,000 ft. from the base or ceiling of the assigned altitudes in the SUA. This minima is unchanged from the conventional vertical separation standard.

4-3. Flight Levels

A. *Flight Level Orientation Scheme*

Altitude assignments for direction of flight will follow the odd altitude assignment for magnetic courses 000-179 degrees and even altitudes for magnetic courses 180-359 degrees for flights up to and including FL410 as indicated in the chart below.

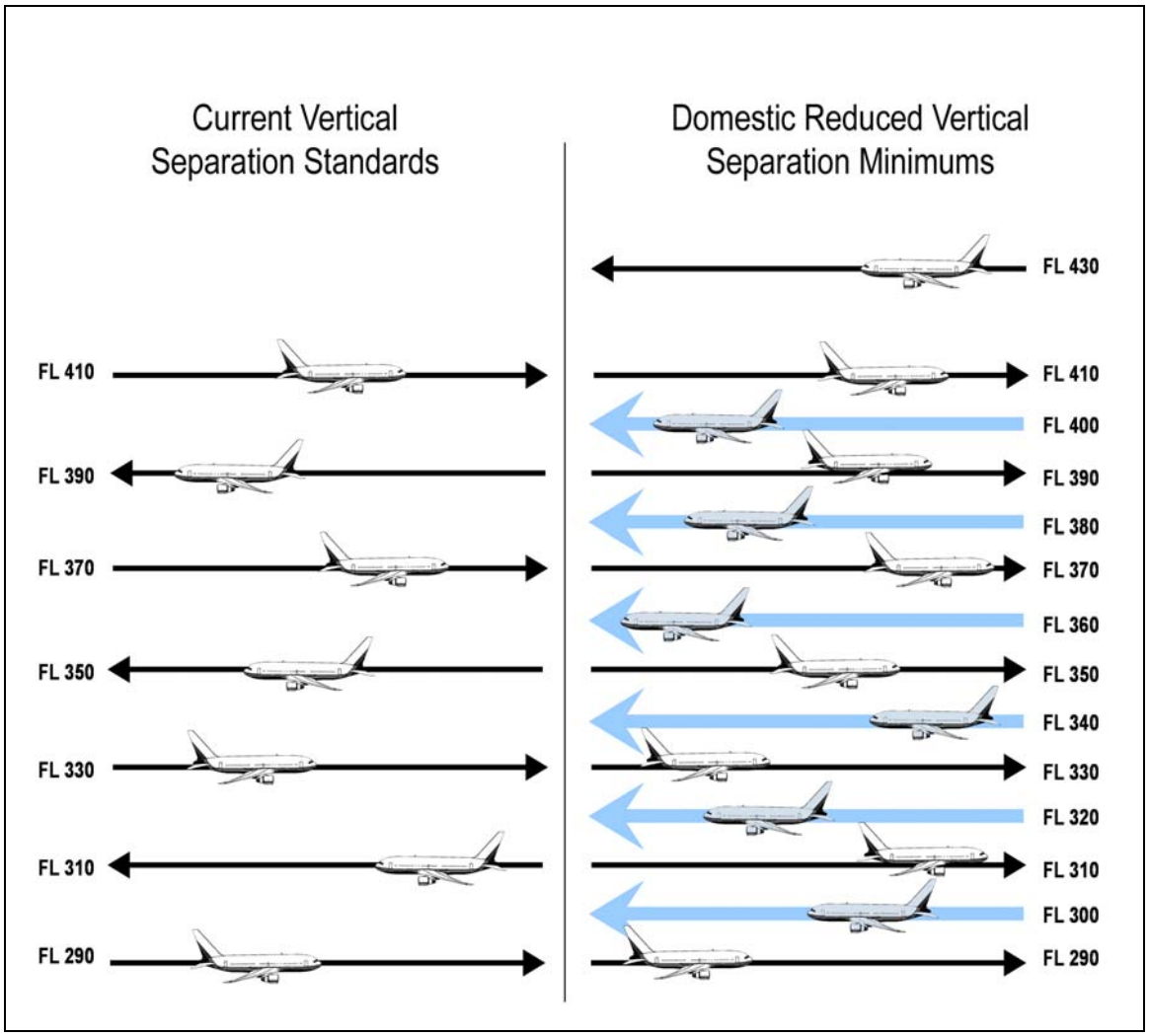

Figure 4-3A.

✈ One of the biggest challenges for operational personnel in the initial phases RVSM implementation is that three altitudes (FL310, FL350, and FL390) change their direction of flight to north and east bound.

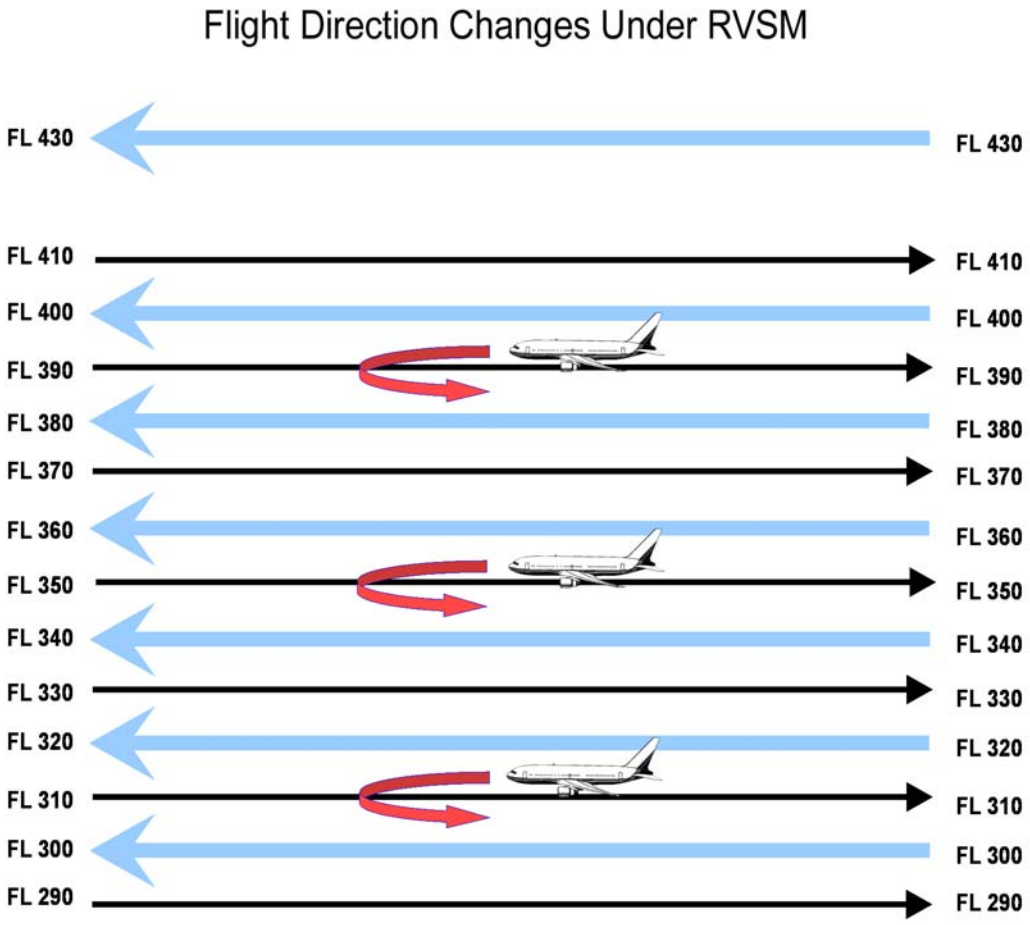

Figure 4-3B.

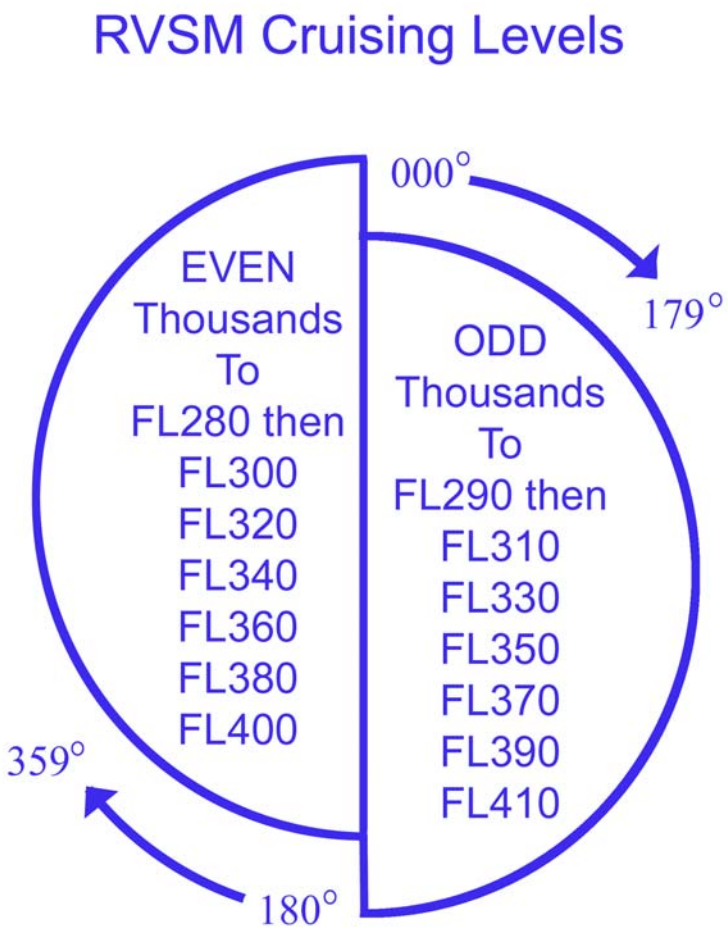

Figure 4-3C.

RVSM Note:
Odd Flight Levels: Magnetic Course 000-179 Degrees
Even Flight Levels: Magnetic Course 180-359 Degree

4-4. Phraseology (Air-ground and intrafacility)

A. Pilot/Controller Phraseology

Figure 4-4 shows standard phraseology that pilots and controllers will use to communicate in DRVSM operations.

FIG 4-4

Standard Phraseology for DRVSM Operations

Message	Phraseology
For a controller to ascertain the RVSM approval status of an aircraft:	**(call sign) confirm RVSM approved**
Pilot indication that flight is RVSM approved	**Affirm RVSM**
Pilot will report lack of RVSM approval (Non-RVSM status): a. On the initial call on any frequency in the RVSM airspace and… b. In all requests for flight level changes pertaining to flight levels within the RVSM airspace and… c. In all read-backs to flight level clearances pertaining to flight levels within the RVSM airspace and… d. In read back of flight level clearances involving climb and descent through RVSM airspace (FL 290-410)	**Negative RVSM, (supplementary information, e.g., "Certification flight").**
Pilot report one of the following after entry into RVSM airspace: all primary altimeters, auto-pilot or altitude alerters have failed. (*This phrase is to be used to convey both the initial indication of RVSM aircraft system failure and on initial contact on all frequencies in RVSM airspace until the problem ceases to exist or the aircraft has exited RVSM airspace).*	**Unable RVSM Due Equipment**
ATC denial of clearance into RVSM airspace	**Unable clearance into RVSM airspace**
Pilot reporting inability to maintain cleared flight level due to weather encounter. *See paragraph 4-6.*	**Unable RVSM due (state reason) (e.g., turbulence, mountain wave)**
ATC requesting pilot to confirm that an aircraft has regained RVSM-approved status or a pilot is ready to resume RVSM	**Confirm able to resume RVSM**
Pilot ready to resume RVSM after aircraft system or weather contingency	**Ready to resume RVSM**

4-5. NON-RVSM Aircraft Requesting Climb/Descent Through RVSM Flight Levels To/From Flight Levels Above RVSM Airspace

A. File-and-Fly. The pre-flight coordination procedures discussed in paragraph 3-3 are not applicable to Non-RVSM aircraft requesting climb to and descent from RVSM flight levels. Their action is to just file a flight plan.

B. Non-RVSM aircraft requesting climb to and descent from flight levels above RVSM airspace will be handled on a workload-permitting basis. The vertical separation standard applied in RVSM airspace between Non-RVSM aircraft and all other aircraft shall be 2,000 feet.

C. Non-RVSM aircraft requesting climb/descent through RVSM airspace can only be considered for accommodation provided:

1. Aircraft is capable of a continuous climb/descent and does not need to level off at an intermediate altitude for any operational considerations and

2. Aircraft is capable of climb/descent at the normal rate for the aircraft.

D. The pilot of Non-RVSM aircraft will inform the controller of the lack of RVSM approval by use of the phrase "Negative RVSM" in accordance with Figure 4-4.

4-6. Guidance on Severe Turbulence and Mountain Wave Activity (MWA)

A. Introduction/Explanation

1. The information and practices in this paragraph are provided to emphasize to pilots and controllers the importance of taking appropriate action in RVSM airspace when aircraft experience severe turbulence and/or MWA that is of sufficient magnitude to significantly affect altitude-keeping.

2. Severe Turbulence. Severe turbulence causes large, abrupt changes in altitude and/or attitude usually accompanied by large variations in indicated airspeed. Aircraft may be momentarily out of control. Encounters with severe turbulence must be remedied immediately in any phase of flight. Severe turbulence may be associated with MWA.

3. Mountain Wave Activity (MWA).

a. Significant MWA occurs both below and above the floor of RVSM airspace, FL 290. MWA often occurs in western states in the vicinity of mountain ranges. It may occur when strong winds blow perpendicular to mountain ranges resulting in up and down or wave motions in the atmosphere. Wave action can produce altitude excursions and airspeed fluctuations accompanied by only light turbulence. With sufficient amplitude, however, wave action can induce altitude and airspeed fluctuations accompanied by severe turbulence. MWA is difficult to forecast and can be highly localized and short lived.

b. Wave activity is not necessarily limited to the vicinity of mountain ranges. Pilots experiencing wave activity anywhere that significantly affects altitude-keeping can follow the guidance provided below.

c. In-flight MWA Indicators (including turbulence). Indicators that the aircraft is being subjected to MWA are:

(1) Altitude excursions and/or airspeed fluctuations with or without associated turbulence.

(2) Pitch and trim changes required to maintain altitude with accompanying airspeed fluctuations.

(3) Light to Severe Turbulence depending on the magnitude of the MWA.

4. Priority for Controller Application of Merging Target Procedures.

a. Explanation of Merging Target Procedures. As described in paragraph 3 below, ATC will use "merging target procedures" to mitigate the effects of both severe turbulence and MWA. The procedures in paragraph 3 have been adapted from existing procedures published in FAA Order 7110.65, paragraph 5-1-8 (Merging Target Procedures). Paragraph 5-1-8 calls for enroute controllers to advise pilots of potential traffic that they perceive may fly directly above or below his/her aircraft at minimum vertical separation. In response, pilots are given the option of requesting a radar vector to ensure their radar target will not merge or overlap with the traffic's radar target.

b. The provision of "merging target procedures" to mitigate the effects of severe turbulence and/or MWA is not optional for the controller, but rather is a priority responsibility. Pilot requests for vectors for traffic avoidance when encountering MWA or pilot reports of "Unable RVSM due turbulence or MWA" are considered first priority aircraft separation and sequencing responsibilities. (FAA Order 7110.65, paragraph 2-1-2 states that the controller's first priority is to separate aircraft and issue safety alerts).

c. Explanation of the term "traffic permitting". The contingency actions for MWA and severe turbulence detailed in paragraph "i", state that the controller will "vector aircraft to avoid merging targets with traffic at adjacent flight levels, traffic permitting." The term "traffic permitting" is not intended to imply that merging target procedures are not a priority duty. The term is intended to recognize that, as stated in FAA Order 7110.65, paragraph 2-1-2, there are circumstances when the controller is required to perform more than one action and must "exercise their best judgment based on the facts and circumstances known to them" to prioritize their actions. Further direction given is: "That action which is most critical from a safety standpoint is performed first."

d. TCAS Sensitivity. For both MWA and severe turbulence encounters in RVSM airspace, an additional concern is the sensitivity of collision avoidance systems when one or both aircraft operating in close proximity receive TCAS advisories in response to disruptions in altitude hold capability.

B. Pre-Flight Tools. Sources of observed and forecast information that can help the pilot ascertain the possibility of MWA or severe turbulence are: Forecast Winds and Temperatures Aloft (FD), Area Forecast (FA), SIGMETS and PIREPS.

C. Pilot Actions When Encountering Weather (e.g., Severe Turbulence or MWA)

1. Weather Encounters Inducing Altitude Deviations of Approximately 200 feet. When the pilot experiences weather induced altitude deviations of approximately 200 feet, the pilot will contact ATC and state "Unable RVSM Due (state reason) (e.g., turbulence, mountain wave). See contingency actions in paragraph 4-8.

2. Severe Turbulence (including that associated with MWA). When pilots encounter severe turbulence, they should contact ATC and report the situation. Until the pilot reports clear of severe turbulence, the controller will apply merging target vectors to one or both passing aircraft to prevent their targets from merging:

a. Pilot: Yankee 123, FL 310, unable RVSM due severe turbulence.

b. Controller: Yankee 123, fly heading 290; traffic twelve o'clock, 10 miles, opposite direction; eastbound MD-80 at FL 320; (or the controller may issue a vector to the MD-80 traffic to avoid Yankee 123)

3. MWA. When pilots encounter MWA, they should contact ATC and report the magnitude and location of the wave activity. When a controller makes a merging targets traffic call, the pilot may request a vector to avoid flying directly over or under the traffic. In situations where the pilot is experiencing altitude deviations of 200 feet or greater, the pilot will request a vector to avoid traffic. Until the pilot reports clear of MWA, the controller will apply merging target vectors to one or both passing aircraft to prevent their targets from merging:

a. Pilot: Yankee 123, FL 310, unable RVSM due mountain wave.

b. Controller: Yankee 123, fly heading 290; traffic twelve o'clock, 10 miles, opposite direction; eastbound MD-80 at FL 320; (or the controller may issue a vector to the MD-80 traffic to avoid Yankee 123)

- This could mean vectoring the traffic for the aircraft experiencing the turbulence since the affected aircraft may not be able to take the vector.
- Pilot reports of turbulence less than severe will trigger a higher level of awareness for controllers to issue traffic advisories when 1,000 feet separation is applied. Pilots may request vectors to avoid merging targets.

4. FL Change or Re-route. To leave airspace where MWA or severe turbulence is being encountered, the pilot may request a FL change and/or reroute, if necessary.

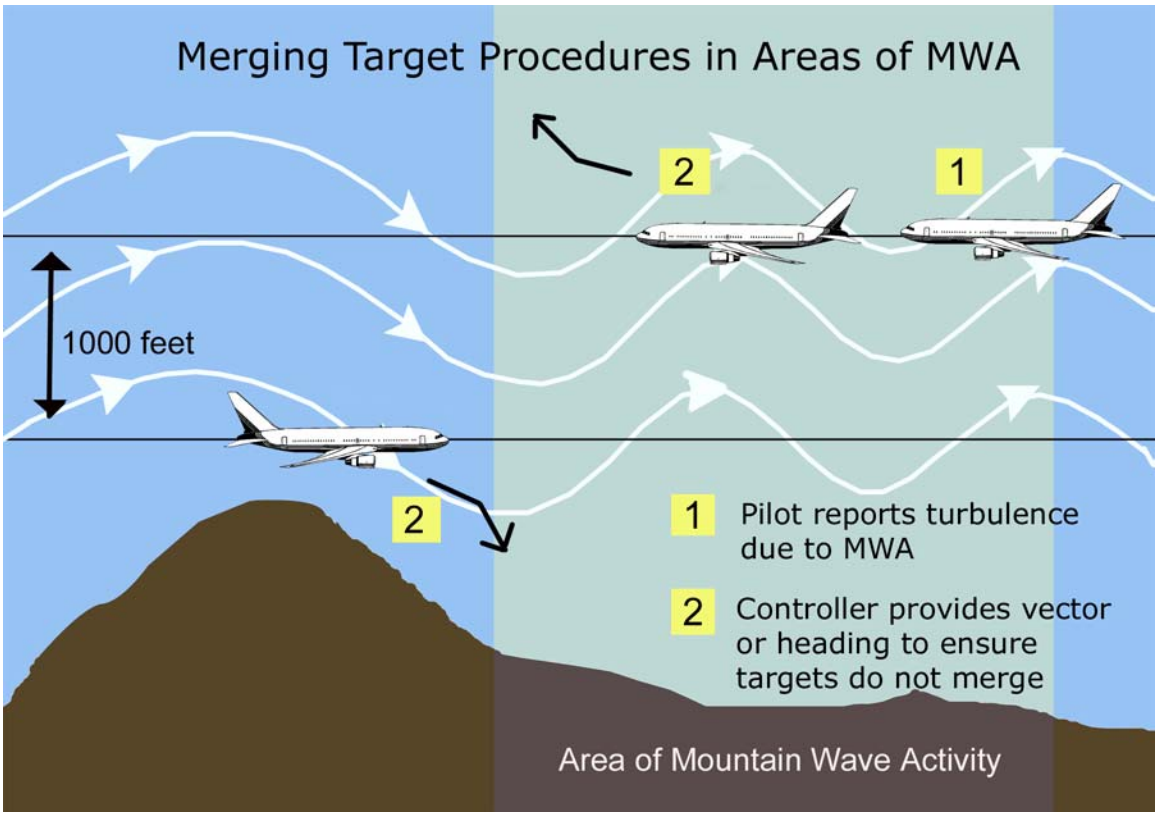

Figure 4-6

4-7. Guidance on Wake Turbulence

A. Pilots should be aware of the potential for wake turbulence encounters following DRVSM implementation. Experience gained since 1997, however, has shown that such encounters in RVSM airspace are generally moderate or less in magnitude.

B. It is anticipated that, in DRVSM airspace, wake turbulence experience will mirror European RVSM experience gained since January 2002. European authorities have found that reports of wake turbulence encounters had not increased significantly since RVSM implementation (eight versus seven reports in a ten month period). In addition, they found that reported wake turbulence was generally similar to moderate clear air turbulence.

C. Pilot Action.

1. Pilots should be alert for wake turbulence when operating:

a. In the vicinity of aircraft climbing or descending through their altitude.
b. Approximately 12-15 miles after passing 1,000 feet below opposite-direction traffic.
c. Approximately 12-15 miles behind and 1,000 below same-direction traffic.

2. Pilots encountering or anticipating wake turbulence in DRVSM airspace have the option of requesting a vector, FL change or if capable, a lateral offset.

NOTE 1. Offsets of approximately a wing span upwind generally can move the aircraft out of the immediate vicinity of another aircraft's wake vortex.

NOTE 2. In domestic U.S. airspace, pilots must request clearance to fly a lateral offset. Strategic lateral offsets flown in oceanic airspace do not apply.

D. The FAA will track wake turbulence events as an element of its post implementation program. The FAA will advertise wake turbulence reporting procedures to the operator community and publish reporting procedures on the RVSM Documentation Webpage (www.faa.gov/ats/ato/rvsm1.htm).

✈ Controllers will handle wake turbulence in accordance with the current practice of accommodating the pilot's request to the extent possible.

4-8. Contingency Actions: Weather Encounters and Aircraft System Failures

The figures in this paragraph provide pilot guidance on actions to take under certain conditions of aircraft system failure and weather encounters. It also describes the expected ATC controller actions in these situations. It is recognized that the pilot and controller will use judgment to determine the action most appropriate to any given situation.

Figure 4-8A
Initial Pilot Actions in Contingency Situations

Initial Pilot Actions when unable to maintain flight level (FL) or unsure of aircraft altitude-keeping capability:
• Notify ATC and request assistance as detailed below • Maintain cleared flight level, to the extent possible, while evaluating the situation • Watch for conflicting traffic both visually and by reference to TCAS, if equipped • Alert nearby aircraft by illuminating exterior lights (commensurate with aircraft limitations)

Figure 4-8B
Severe Turbulence and/or
Mountain Wave Activity (MWA) Induced Altitude Deviations of Approximately 200 feet

Pilot will:	Controller will:
• When experiencing severe turbulence and/or MWA induced altitude deviations of approximately 200 feet or greater, pilot will contact ATC and state "Unable RVSM Due (state reason)" (e.g., turbulence, mountain wave) • If not issued by the controller, request vector clear of traffic at adjacent FL's • If desired, request FL change or re-route • Report location and magnitude of turbulence or MWA to ATC	• Vector aircraft to avoid merging target with traffic at adjacent flight levels, traffic permitting • Advise pilot of conflicting traffic • Issue FL change or re-route, traffic permitting • Issue PIREP to other aircraft
See paragraph 4-6 for detailed guidance.	**Paragraph 4-6 explains "traffic permitting."**

Figure 4-8C
Mountain Wave Activity (MWA) Encounters – General

Note: MWA encounters do not necessarily result in altitude deviations on the order of 200 feet. The guidance below is intended to address less significant MWA encounters.

Pilot actions:	**Controller actions:**
• Contact ATC and report experiencing MWA • If so desired, pilot may request a FL change or re-route • Report location and magnitude of MWA to ATC **See paragraph f for guidance on MWA.**	• Advise pilot of conflicting traffic at adjacent FL • If pilot requests, vector aircraft to avoid merging target with traffic at adjacent RVSM flight levels, traffic permitting • Issue FL change or re-route, traffic permitting • Issue PIREP to other aircraft **Paragraph f (d) (3) explains "traffic permitting."**

Figure 4-8D
Wake Turbulence Encounters

Pilot should:	**Controller should:**
• Contact ATC and request vector, FL change or, if capable, a lateral offset **See Section 4-7 for guidance on wake turbulence.**	• Issue vector, FL change or lateral offset clearance, traffic permitting

Figure 4-8E
"Unable RVSM Due Equipment"
Failure of Automatic Altitude Control System, Altitude Alerter or All Primary Altimeters.

Pilot will:	**Controller will:**
• Contact ATC and state "Unable RVSM Due Equipment" • Request clearance out of RVSM airspace unless operational situation dictates otherwise	• Provide 2,000 ft. vertical separation or appropriate horizontal separation • Clear aircraft out of RVSM airspace unless operational situation dictates otherwise

Controllers have frequently asked when a pilot advises he is unable RVSM due equipment how quickly must the aircraft be removed from RVSM airspace? The first objective is to establish 2,000 feet vertical separation within a reasonable period of time and remove the aircraft from RVSM airspace once the required separation has been achieved. The removal should also be accomplished within a reasonable period of time. Changing the equipment suffix to reflect the new aircraft status is also a requirement in these situations.

Figure 4-8F

One Primary Altimeter Remains Operational.

Pilot will:	Controller will:
• Cross check stand-by altimeter • Notify ATC of operation with single primary altimeter • If unable to confirm primary altimeter accuracy, follow actions for failure of all primary altimeters	• Acknowledge operation with single primary altimeter • Relay to other controllers or facilities who will subsequently handle the aircraft and any special handling required or being provided.

4-9. Transponder Failure

Figure 4-9

Pilot will:	**Controller will:**
• Contact ATC and request authority to continue to operate at cleared flight level • Comply with revised ATC clearance, if issued Note: Part 91 Section 91.215 (ATC transponder and altitude reporting equipment and use) regulates operation with the transponder inoperative. See below.	• Consider request to continue to operate at cleared flight level • Issue revised clearance, if necessary

§ Re-print of Significant Sections of 91.215 (ATC transponder and altitude reporting equipment and use).

A. ***91.215(b).*** *All airspace.* **Unless otherwise authorized or directed by ATC,** no person may operate an aircraft in the airspace described in paragraphs (b)(1) through (b)(5) of this section, unless that aircraft is equipped with an operable coded radar beacon transponder having either Mode 3/A 4096 code capability, replying to Mode 3/A interrogations with the code specified by ATC, or a Mode S capability, replying to Mode 3/A interrogations with the code specified by ATC and intermode and Mode S interrogations in accordance with the applicable provisions specified in TSO C–112, and that aircraft is equipped with automatic pressure altitude reporting equipment having a Mode C capability that automatically replies to Mode C interrogations by transmitting pressure altitude information in 100-foot increments. This requirement applies to:

1. *All aircraft.* In Class A, Class B, and Class C airspace areas;

2. *All aircraft. In all airspace within 30 nautical miles of an airport listed in appendix D, section 1 of this part from the surface upward to 10,000 feet MSL;*

B. 91.215(c) *Transponder-on operation*. While in the airspace as specified in paragraph (b) of this section or in all controlled airspace, each person operating an aircraft equipped with an operable ATC transponder maintained in accordance with §91.413 of this part shall operate the transponder, including Mode C equipment if installed, and shall reply on the appropriate code or as assigned by ATC.

C. 91.215(d) ***ATC authorized deviations.*** Requests for ATC authorized deviations must be made to the ATC facility having jurisdiction over the concerned airspace within the time periods specified as follows:

1. For operation of an aircraft with an operating transponder but without operatingautomatic pressure altitude reporting equipment having a Mode C capability, the request may be made at any time.

2. For operation of an aircraft with an inoperative transponder to the airport of ultimate destination, including any intermediate stops, or to proceed to a place where suitable repairs can be made or both, the request may be made at any time.

3. For operation of an aircraft that is not equipped with a transponder, the request must be made at least one hour before the proposed operation.

4-10. Two-way Radio Communications Failure

A. It is virtually impossible to provide regulations and procedures applicable to all possible situations associated with two-way radio communications failure. During two-way radio communications failure, when confronted by a situation not covered in the regulation, pilots are expected to exercise good judgment in whatever action they elect to take. Should the situation so dictate they should not be reluctant to use the emergency action contained in 14 CFR Section 91.3(b).

B. Whether two-way communications failure constitutes an emergency depends on the circumstances, and in any event, it is a determination made by the pilot. 14 CFR Section 91.3(b) authorizes a pilot to deviate from any rule in Subparts A and B to the extent required to meet an emergency.

C. In the event of two-way radio communications failure, ATC service will be provided on the basis that the pilot is operating in accordance with 14 CFR Section 91.185.

4-11. Traffic Alert and Collision Avoidance System II (TCAS II) Resolution Advisories

A. Pilots should operate in Reduced Vertical Separation Minimum airspace with TCAS II in the TA/RA mode. To minimize the vertical height deviation caused by a Resolution Advisory (RA), it is important that pilots follow that maneuver guidance as precisely as possible.

B. The most recent version of TCAS II, TCAS II v. 7.0, incorporates modifications that enable it to operate within the confines of Reduced Vertical Separation Minimum. Whenever needed, TCAS II readily provides collision avoidance maneuver guidance for pilots.

C. To prevent nuisance alerts due to the reduced vertical spacing in RVSM airspace, TCAS II v. 7.0 will provide a Traffic Advisory (TA) based on a time-to-go of 48 seconds to the Closest Point of Approach (CPA), a distance of 1.3 MN and/or a vertical spacing of 850 ft. Pilots should never maneuver in response to the TA. The main function of the TA is to prepare the crew for a possible Resolution Advisory (RA). TAs are not to be notified to the air traffic controller.

D. TCAS II v. 7.0 provides Resolution Advisory (RA) maneuver guidance whenever the “intruder” aircraft is within 35 seconds time-to-go to CPA, a distance of 1.1 NM and/or vertical spacing of 700 ft. Maneuvers caused by RAs are to be to be followed with as precisely as possible and to be notified to the air traffic controller “as soon as practicable.” The TCAS maneuver guidance always takes precedent over clearances from air traffic controllers.

E. TCAS equipage requirements are contained in 14 CFR sections 121.356, 125.224, 129.18 and 135.189. Part 91 Appendix G does not contain TCAS equipage requirements specific to RVSM. However, Appendix G does require that aircraft equipped with TCAS II and flown in RVSM airspace be modified to incorporate TCAS II Version 7.0 or a later version.

4-12. Fuel Dumping

A. Separation of known aircraft from an aircraft that is dumping fuel will be as follows:

1. 1000 feet above it or in accordance with Vertical Separation Minima noted earlier; whichever is greater.
2. 2,000 feet below it.
3. 5 miles longitudinally.
4. 5 miles laterally.

4-13. Additional Separation for Formation Flights

A. Because of the distance allowed between formation aircraft and lead aircraft, additional separation is necessary to ensure the periphery of the formation is adequately separated from other aircraft, adjacent airspace, or obstructions.

B. Aircraft operating in a formation flight are considered Non-RVSM aircraft regardless of their single-ship status.

✈ Controllers need to modify the equipment suffix when equipped aircraft join in formation to reflect the flight as non-RVSM. Upon breakup, if the formation aircraft remain in RVSM airspace the equipment suffix needs to again be modified to reflect the aircraft as RVSM.

4-14. Duty Familiarization and Transfer of Position Responsibility

When transferring position responsibility, controllers working non-RVSM aircraft should take special precautions to include this as part of their traffic briefing.

✈ FAA ORDER 7110.65, Paragraph 2-2-3. DUTY FAMILIARIZATION AND THE TRANSFER OF RESPONSIBILITY is being revised to include “NON-RVSM AIRCRAFT OPERATIONS as an item to be considered for inclusion in the tailored checklist at appropriate sectors.

SECTION 5. ATS SUPPORT SYSTEMS

5-1. General

A. Given the requirement to accommodate certain exception categories of aircraft from the exclusionary provision of RVSM airspace on a workload-permitting basis, it is essential that certain support systems be modified for RVSM compatibility. It is necessary for ATC to be systematically aware as to the RVSM approval status of all aircraft operating within RVSM airspace, as well as outside of and in close proximity to RVSM airspace. The support systems adaptations described in this section have been modified to support this safety critical operational requirement.

B. Also significant is the operational requirement for ATC to be aware of an aircraft's status as one of the categories of exception flights when such an aircraft is requesting operation within RVSM airspace and it has not indicated that it is RVSM approved.

C. The requirement for ATC to selectively apply two vertical separation minimums within RVSM airspace as a result of the requirements to accommodate those non-RVSM aircraft from exception categories on a workload-permitting basis and RVSM aircraft makes flight planning requirements for RVSM airspace safety critical.

D. Non-RVSM aircraft will also require various levels of verbal coordination when transiting international boundaries. The ATCSCC will be involved with their Canadian counterparts for aircraft crossing the northern FIR boundaries as well as with individual facility TMUs. Non-RVSM flights operating to and from Mexico will be dependent on any additional coordination being accomplished facility to facility.

E. No changes were made to Flight Data Processing Systems and resulting strip output. Data exchange methods with Canada and Mexico are unchanged and remain primarily manual in nature. Changes were made to the radar data processors (primary and backup), the display system, and to URET to support these operational needs. Changes are also made to the ETMS.

5-2. ATS System Change Overview

A. RDP – Conflict Alert (HOST, MEARTS, New DARC – aka EBUS) was modified to selectively apply the applicable vertical separation minimum of either 1,000 feet or 2,000 feet as determined by the equipment suffix in the flight plan for aircraft operating in RVSM airspace.

B. Display system (DSR, MEARTS) was modified to display a coral box around the B4 character of the full data block whenever the flight plan does not contain a RVSM equipment suffix, and one of the following happens;

1. A hard, interim, or reported altitude of FL290 or higher is entered.

2. Mode C is in, or within 900 feet of, RVSM airspace (at or above FL281, unless the aircraft is assigned FL280, in which case the coral box will display at or above FL283).

3. The coral box will also remain visible should the aircraft climb above RVSM airspace.

✈ The visual cue of the coral box will be applied to non-RVSM aircraft because it is anticipated that they will comprise less than 2% of the flights operating at RVSM altitudes. The intensity of the coral box is tied to the data block intensity. It cannot be changed independently.

C. URET - There have been numerous changes made to the URET system in order for it to be compatible and supportive of the implementation of RVSM within the NAS operational environment. Primarily these modifications fit into three categories:

1. logic changes
2. display changes with no operational impact
3. new functionality, primarily related to the non-RVSM indicator.

D. Logic changes**.** The conflict probe has been revised to use RVSM separation standards. The Inappropriate Altitude for Direction of Flight (IAFDOF) logic has also been revised to reflect the directions of flight in RVSM airspace.

E. Display changes**.** The wind grid now displays RVSM altitudes. Selection when using the wind grid altitude menu is unchanged. The altitude menu for RVSM aircraft has been updated to include RVSM altitudes. Use of this feature remains unchanged from its current operation. On the altitude menu for non-RVSM aircraft, the RVSM altitudes are shaded grey. The shaded altitudes are still selectable, they just serve as a reminder that the selected aircraft is non-RVSM and those are altitudes that may not be appropriate.

F. URET CHI and automation**.** As in DSR, URET displays a coral box on the ACL and GPD whenever the following conditions are met:

1. The flight plan does not contain a RVSM qualifying equipment suffix and...
2. Either the assigned altitude or the interim altitude or the most recent track report is at or above FL290.

G. The non-RVSM indicator also appears automatically on a departure list entry with a non-RVSM equipment suffix and a requested flight plan altitude of FL 290 or higher.

H. Automated non-RVSM indicators are on by default. An option has been added to the Tools menu that allows you to turn them off if your sector does not have RVSM altitudes. The Indicators On/Off option is disabled if your sector includes RVSM altitudes.

I. To manually display all non-RVSM aircraft on either list is also available by positioning the cursor over the Altitude column header and pressing the left trackball button. The non-RVSM indicator will appear for any entry that has a non-RVSM equipment suffix.

- ✈ You cannot turn off non-RVSM indicators if you own any airspace encompassing FL290 and above.
- ✈ If a sector with RVSM altitudes is combined at a sector with no RVSM altitudes, the non-RVSM pick area becomes inactive.

5-3. OASIS. & Model 1

A minor modification is being deployed to permit flight plan filing using new equipment suffixes for the FAA Flight Plan form. The modification will permit filing the /Q equipment suffix by January 20, 2005. Presently, both FAA and ICAO flight plans filed through these systems may be shown RVSM-compliant with a /W equipment qualifier.

5-4. ETMS Display

1. Squares will be drawn around non-compliant flights when they are drawn on the TSD.

2. Non-compliant flights will be flagged when they appear in list reports or on-line displays.

3. Counts of the number of non-compliant flights in a sector will be displayed on the Alert Timeline and Center Monitor.

4. Upon user request, sectors containing non-compliant flights will be highlighted on the TSD, in a manner similar to the way sectors that exceed their MAP threshold are currently highlighted.

5-5. National Traffic Management Log (NTML)

This program will be modified to permit entry and tracking of requests for non-RVSM aircraft to operate in RVSM airspace. Modifications will not be complete until Spring 2005 timeframe.

SECTION 6. Air Traffic Management Considerations

6-1. General

The Traffic Management System mission is to balance air traffic demand with system capacity to ensure the maximum efficient utilization of the NAS. A safe, orderly and expeditious flow of traffic while minimizing delays is fostered through analysis, coordination, and dynamic utilization of traffic management initiatives and programs. The introduction of RVSM will require that air traffic facilities across the NAS develop a unified approach to traffic flow management in RVSM airspace.

6-2. ATC Sectorization

Across the domestic U.S. there are just over 400 en route sectors. Above flight level 290 the only altitudes routinely assigned prior to RVSM were odd cardinal flight levels. As sectors were created, they usually were defined by the span of usable flight levels within their respective strata; e.g. a high sector may extend up to FL330 and an ultra-high sector would begin at FL350 and contain the airspace above. Now, as RVSM is introduced, the newly usable even cardinal flight levels must be included in either the high or ultra-high sectors. Over the past year, a detailed analysis of existing and planned traffic flows was conducted across the US to help determined which sectors should contain these newly assignable flight levels. The resulting allocation of even flight levels will affect almost 200 sectors, necessitating adaptation changes to sectors, routes, fixes and procedures to properly manage the airspace.

6-3. Air Traffic Management (Flow)

The introduction of six additional altitudes above FL 290 will allow more efficient use of the airspace as well as provide additional capacity. RVSM altitudes will allow the opportunity to de-conflict historically congested traffic flows to increase efficiency and maximize en route flexibility. Traffic Management Officers in each individual ARTCC have identified areas within their operation that could be potential chokepoint areas, and where benefits as well as possible impacts could be realized. Additionally, a thorough analysis of the airspace was conducted that identified sector stratification and frequency issues as well as areas where direct benefit to both customers and service providers could be realized.

6-4. Interfacility LOAs and Agreements

As traffic moves across sector and facility airspace boundaries, the control of aircraft is governed by a tailored set of procedures to reduce workload during the “handoff” from one sector to another. Some of these procedures are developed in written form and applied by controllers working the position. Others, such as radar handoff message routing, are contained in automation adaptation records. As new even cardinal flight levels are introduced in RVSM airspace, all of these procedures must be reviewed to insure that the assignable flight levels in the procedure match the RVSM flight level assignment table. Additionally, as traffic patterns change after introduction of RVSM, many of these agreements will require review to insure that they continue to optimize traffic patterns.

SECTION 7.TRANSITION to RVSM

7-1. Transition Readiness Verification

National transition readiness is verified at both the field facility and national levels using published Transition Readiness Checklists. A dry-run of Day One RVSM activation events, known as the RVSM Transition Tabletop Exercise, will be held on December 9, 2005. All ATC field facilities with RVSM airspace and national support personnel will participate in a walkthrough of the activation timeline events and a review of roles and responsibilities. Selected contingency scenarios will be simulated to verify that field and national personnel share a common understanding of the documented risk mitigation strategies and responsibilities.

7-2. National Transition Approach

The transition approach for DRVSM is to implement RVSM in domestic US airspace at all facilities with RVSM airspace simultaneously at 0901 UTC on January 20, 2005. This national simultaneous transition approach was adopted to eliminate the continuous need to transition aircraft from conventional vertical separation (CVS) standards to RVSM, and vice versa.

7-3. Day One Transition Concepts

A. The key concepts for conducting and managing RVSM activation on January 20, 2005, are:

1. **Centralized monitoring of site status** will be conducted from the ATC System Command Center via a designated RVSM Transition Teleconference bridge. The RVSM Transition Teleconference will begin at 0700 UTC, two hours prior to activation at 0901, and continue through 0300 UTC on January 21st.

2. **Redundant Transition Teleconference Bridges** will be provided for use throughout Day One operations to ensure no loss of communications.

3. **National DRVSM program subject matter experts** will be continuously available to sites during Day One operations.

4. **Second-level system support experts** from the William J. Hughes Technical Center will be continuously available throughout Day One operations in order to provide general technical support as site automation personnel are bringing up RVSM-related automation, and via normal Help Desk access thereafter.

5. **Active polling to verify site status** will be used to obtain positive feedback of site status for key events.

6. **Local flexibility** allows each facility to determine the best time for their local RVSM automation actions. Facilities in the Eastern and Central time zones will complete the installation of their January 20 adaptation changes at least one hour prior to RVSM activation, but many facilities in the Pacific or Mountain time zones are planning to wait until 1000 UTC to begin installing adaptation changes to avoid using back-up systems during late evening hours. Key events, however, must be synchronized across all facilities.

7. **A two-hour "national ATC stabilization period"** has been defined. The period from 0800 UTC to 1000 UTC on January 20th has been designated as a period during which no routine

maintenance or certification actions will take place. The purpose of the stabilization period requirement is to mitigate risk for national RVSM activation at 0901UTC.

8. **Continuous national expert support** available to facilities in real-time via the National Teleconference Bridge until 0300 UCT on January 21. Expert support remains available on request via "hotline" numbers for fifteen days.

7-4. Detailed Day One Timeline

Time (UTC)	Action
Jan 20 0500	National RVSM experts from WJHTC, ATCSCC, and HQ in place.
0500	ATCSCC and TMUs in field facilities prepared to receive pre-coordination request calls for non-RVSM exception aircraft
0700	National telephone bridge established and roll call begins
No Later Than 0800	All ATC automation systems ready for RVSM activation
0800	Start of two-hour "national ATC stabilization period"
0800	Designated operational supervisory staff and RVSM subject matter experts in place at all facilities
0800	RVSM enabled in ETMS to identify non-RVSM aircraft filed for RVSM altitudes
No Later Than 0830	Enable display of non-RVSM indicator on controller displays
0830	Initial general broadcast message to aircraft: *"ATTENTION ALL AIRCRAFT, RVSM OPERATIONS WILL BEGIN IN 30 MINUTES".*
By 0851	Non-compliant aircraft in RVSM airspace removed, with exception of exceptions that can be accommodated.
0851	Final general broadcast message prior to RVSM activation: *"ATTENTION ALL AIRCRAFT, RVSM OPERATIONS WILL BEGIN AT 0901Z".*
0901	Enable RVSM conflict alert logic in Host
Beginning at 0901	Move westbound aircraft to RVSM altitudes.
1000	End of two-hour "national ATC stabilization period"
Until **Jan 21** 0300	National experts remain available to provide facilities support, as needed, via national telephone bridge.

SECTION 8. Appendixes

A. APPENDIX A - Acronyms

AAD.....Assigned Altitude Deviation
ACAS.....Airborne Collision Avoidance System
AGHME.....Aircraft Geometric Height Monitoring Element
AIC.....Aeronautical Information Circular
AIP.....Aeronautical Information Publication
ASE.....Altimetry System Error
ATA.....Air Transport Association of America
ATC.....Air Traffic Control
ATCAA.....Air Traffic Control Assigned Airspace
ATCSCC.....Air Traffic Control System Command Center
ATM.....Air Traffic Management
ATS.....Air Traffic Services
CFR.....Code of Federal Regulations
CIC.....Controller-in-Charge
CMA.....Central Monitoring Agency
DCP.....Document Change Proposal
DCPC.....Direct Controller/Pilot Communications
DoD.....Department of Defense
ETMS.....Enhanced Traffic Management System
FAA.....Federal Aviation Administration
FDPS.....Flight Data Processing System
FIR.....Flight Information Region
FL.....Flight Level
FLAS.....Flight Level Allocation Scheme
GMU.....GPS Height Monitoring Unit
GMS.....Ground Monitoring System
GPS.....Global Positioning System
HMU.....Height Monitoring Unit
IAFDOF.....Inappropriate Altitude for the Direction of Flight
ICAO.....International Civil Aviation Organization
JAA.....Joint Airworthiness Authorities
LOA.....Letter of Agreement
M-EARTS.....Micro-En Route Automated Radar Tracking System
MWA.....Mountain Wave Activity
NAS.....National Airspace System
NAT.....North Atlantic
NASA.....National Aeronautics and Space Administration
NATSPG.....North Atlantic System Planning Group
NOTAM.....Notice to Airmen
NTML.....National Traffic Management Log
OASIS.....Operational and Supportability Implementation System
OEP.....Operational Evolution Plan
OLDI.....On-Line Data Interchange
PAC.....Pacific
RGCSP.....Review of the General Concept of Separation Panel
PIREPS.....Pilot Reports
RNAV.....Area Navigation

RNP.....Required Navigation Performance
RTCA.....Radio Technical Commission for Aeronautics
RVSM .....Reduced Vertical Separation Minimum
SIGMET.....Significant Meteorological Information
STMC.....Supervisor Traffic Management Coordinator
SUA .....Special Use Airspace
TCAS .....Traffic Alert and Collision Avoidance System
TMU.....Traffic Management Unit
TVE.....Total Vertical Error
URET .....User Request Evaluation Tool
VSIG .....Vertical Separation Implementation Group
WATRS .....West Atlantic Route System

B. APPENDIX B – 14 CFR Parts 11 and 91 Reduced Vertical Separation Minimum in Domestic United States Airspace; Final Rule

1. § 91.180 Operations within airspace designated as Reduced Vertical Separation Minimum airspace.

a. Except as provided in paragraph (b) of this section, no person may operate a civil aircraft in airspace designated as Reduced Vertical Separation Minimum (RVSM) airspace unless:

(1) The operator and the operator's aircraft comply with the minimum standards of appendix G of this part; and
(2) The operator is authorized by the Administrator or the country of registry to conduct such operations.

b. The Administrator may authorize a deviation from the requirements of this section.

[Amdt. 91–276, 68 FR 70133, Dec. 17, 2003]

C. Appendix G to Part 91—Operations in Reduced Vertical Separation Minimum (RVSM) Airspace

1. Section 1- Definitions

a. Reduced Vertical Separation Minimum (RVSM) Airspace. Within RVSM airspace, air traffic control (ATC) separates aircraft by a minimum of 1,000 feet vertically between flight level (FL) 290 and FL 410 inclusive. RVSM airspace is special qualification airspace; the operator and the aircraft used by the operator must be approved by the Administrator. Air-traffic control notifies operators of RVSM by providing route planning information. Section 8 of this appendix identifies airspace where RVSM may be applied.

b. RVSM Group Aircraft. Aircraft within a group of aircraft, approved as a group by the Administrator, in which each of the aircraft satisfies each of the following:

(1) The aircraft have been manufactured to the same design, and have been approved under the same type certificate, amended type certificate, or supplemental type certificate.

(2) The static system of each aircraft is installed in a manner and position that is the same as those of the other aircraft in the group. The same static source error correction is incorporated in each aircraft of the group.

(3) The avionics units installed in each aircraft to meet the minimum RVSM equipment requirements of this appendix are:

(a) Manufactured to the same manufacturer specification and have the same part umber; or

(b) (2) Of a different manufacturer or part number, if the applicant demonstrates that the equipment provides equivalent system performance.

c. RVSM Non-group Aircraft. An aircraft that is approved for RVSM operations as an individual aircraft.

d. RVSM Flight envelope. An RVSM flight envelope includes the range of Mach number, weight divided by atmospheric pressure ratio, and altitudes over which an aircraft is approved to be operated in cruising flight within RVSM airspace. RVSM flight envelopes are defined as follows:

(1) The full RVSM flight envelope is bounded as follows:

(a). The altitude flight envelope extends from FL 290 upward to the lowest altitude of the following:

- FL 410(the RVSM altitude limit);
- The maximum crtificated altitude for the aircraft; or
- The altitude limited by cruise thrust, buffet, or other flight limitations.

(b). The airspeed flight envelope extends:

- From the airspeed of the slats/flaps-up maximum endurance (holding) airspeed, or the maneuvering airspeed, whichever is lower;
- To the maximum operating airspeed (Vmo/Mmo), or airspeed limited by cruise thrust buffet, or other flight limitations, whichever is lower.

(c). All permissible gross weights within the flight envelopes defined in paragraphs (1) and (2) of this definition.

(2) The basic RVSM flight envelope is the same as the full RVSM flight envelope except that the airspeed flight envelope extends:

e. From the airspeed of the slats/flaps-up maximum endurance (holding) airspeed, or the maneuver airspeed, whichever is lower;

f. To the upper Mach/airspeed boundary defined for the full RVSM flight envelope, or a specified lower value not less than the long-range cruise Mach number plus .04 Mach, unless further limited by available cruise thrust, buffet, or other flight limitations.

2. Section 2- Aircraft Approval

a. An operator may be authorized to conduct RVSM operations if the Administrator finds that its aircraft comply with this section.

b. The applicant for authorization shall submit the appropriate data package for aircraft approval. The package must consist of at least the following:

(1) An identification of the RVSM aircraft group or the nongroup aircraft;
(2) A definition of the RVSM flight envelopes applicable to the subject aircraft;
(3) Documentation that establishes compliance with the applicable RVSM aircraft requirements of this section; and

(4) The conformity tests used to ensure that aircraft approved with the data package meet the RVSM aircraft requirements.

c. Altitude-keeping equipment: All aircraft. To approve an aircraft group or a nongroup aircraft, the Administrator must find that the aircraft meets the following requirements:

(1) The aircraft must be equipped with two operational independent altitude measurement systems.

(2) The aircraft must be equipped with at least one automatic altitude control system that controls the aircraft altitude—

(a) Within a tolerance band of ±65 feet about an acquired altitude when the aircraft is operated in straight and level flight under non-turbulent, non-gust conditions; or

(b) Within a tolerance band of ±130 feet under non-turbulent, non-gust conditions for aircraft for which application for type certification occurred on or before April 9, 1997 that are equipped with an automatic altitude control system with flight management/performance system inputs.

(2) The aircraft must be equipped with an altitude alert system that signals an alert when the altitude displayed to the flight crew deviates from the selected altitude by more than:

(a) ±300 feet for aircraft for which application for type certification was made on or before April 9, 1997; or

(b) ±200 feet for aircraft for which application for type certification is made after April 9, 1997.

d. Altimetry system error containment: Group aircraft for which application for type certification was made on or before April 9, 1997. To approve group aircraft for which application for type certification was made on or before April 9, 1997, the Administrator must find that the altimetry system error (ASE) is contained as follows:

(1) At the point in the basic RVSM flight envelope where mean ASE reaches its largest absolute value, the absolute value may not exceed 80 feet.

(2) At the point in the basic RVSM flight envelope where mean ASE plus three standard deviations reaches its largest absolute value, the absolute value may not exceed 200 feet.

(3) At the point in the full RVSM flight envelope where mean ASE reaches its largest absolute value, the absolute value may not exceed 120 feet.

(4) At the point in the full RVSM flight envelope where mean ASE plus three standard deviations reaches its largest absolute value, the absolute value may not exceed 245 feet.

(5) Necessary operating restrictions. If the applicant demonstrates that its aircraft otherwise comply with the ASE containment requirements, the Administrator may establish an operating restriction on that applicant's aircraft to restrict the aircraft from operating in areas of the basic RVSM flight envelope where the absolute value of mean

ASE exceeds 80 feet, and/or the absolute value of mean ASE plus three standard deviations exceeds 200 feet; or from operating in areas of the full RVSM flight envelope where the absolute value of the mean ASE exceeds 120 feet and/or the absolute value of the mean ASE plus three standard deviations exceeds 245 feet.

e. Altimetry system error containment: Group aircraft for which application for type certification is made after April 9, 1997. To approve group aircraft for which application for type certification is made after April 9, 1997, the Administrator must find that the altimetry system error (ASE) is contained as follows:

(1) At the point in the full RVSM flight envelope where mean ASE reaches its largest absolute value, the absolute value may not exceed 80 feet.

(2) At the point in the full RVSM flight envelope where mean ASE plus three standard deviations reaches its largest absolute value, the absolute value may not exceed 200 feet.

f. Altimetry system error containment: Nongroup aircraft. To approve a nongroup aircraft, the Administrator must find that the altimetry system error (ASE) is contained as follows:

(1) For each condition in the basic RVSM flight envelope, the largest combined absolute value for residual static source error plus the avionics error may not exceed 160 feet.

(2) For each condition in the full RVSM flight envelope, the largest combined absolute value for residual static source error plus the avionics error may not exceed 200 feet.

g. Traffic Alert and Collision Avoidance System (TCAS) Compatibility With RVSM Operations: All aircraft. After March 31, 2002, unless otherwise authorized by the Administrator, if you operate an aircraft that is equipped with TCAS II in RVSM airspace, it must be a TCAS II that meets TSO C–119b (Version 7.0), or a later version.

h. If the Administrator finds that the applicant's aircraft comply with this section, the Administrator notifies the applicant in writing.

3. Section 3. Operator Authorization

a. Authority for an operator to conduct flight in airspace where RVSM is applied is issued in operations specifications, a Letter of Authorization, or management specifications issued under subpart K of this part, as appropriate. To issue an RVSM authorization, the Administrator must find that the operator's aircraft have been approved in accordance with Section 2 of this appendix and the operator complies with this section.

b. An applicant for authorization to operate within RVSM airspace shall apply in a form and manner prescribed by the Administrator. The application must include the following:

(1) An approved RVSM maintenance program outlining procedures to maintain RVSM aircraft in accordance with the requirements of this appendix. Each program must contain the following:

(a) Periodic inspections, functional flight tests, and maintenance and inspection procedures, with acceptable maintenance practices, for ensuring continued compliance with the RVSM aircraft requirements.

(b) A quality assurance program for ensuring continuing accuracy and reliability of test equipment used for testing aircraft to determine compliance with the RVSM aircraft requirements.

(c) Procedures for returning noncompliant aircraft to service.

(2) For an applicant who operates under part 121 or 135 of this chapter or under subpart K of this part, initial and recurring pilot training requirements.

(3) Policies and procedures: An applicant who operates under part 121 or 135 of this chapter or under subpart K of this part must submit RVSM policies and procedures that will enable it to conduct RVSM operations safely.

d. Validation and Demonstration. In a manner prescribed by the Administrator, the operator must provide evidence that:

(1) It is capable to operate and maintain each aircraft or aircraft group for which it applies for approval to operate in RVSM airspace; and

(2) Each pilot has an adequate knowledge of RVSM requirements, policies, and procedures.

4. Section 4. RVSM Operations

a. Each person requesting a clearance to operate within RVSM airspace shall correctly annotate the flight plan filed with air traffic control with the status of the operator and aircraft with regard to RVSM approval. Each operator shall verify RVSM applicability for the flight planned route through the appropriate flight planning information sources.

b. No person may show, on the flight plan filed with air traffic control, an operator or aircraft as approved for RVSM operations, or operate on a route or in an area where RVSM approval is required, unless:

(1) The operator is authorized by the Administrator to perform such operations; and

(2) The aircraft has been approved and complies with the requirements of Section 2 of this appendix.

5. Section 5. Deviation Authority Approval

a. The Administrator may authorize an aircraft operator to deviate from the requirements of §91.180 or §91.706 for a specific flight in RVSM airspace if that operator has not been approved in accordance with section 3 of this appendix if:

(1) The operator submits a request in a time and manner acceptable to the Administrator; and

(2) At the time of filing the flight plan for that flight, ATC determines that the aircraft may be provided appropriate separation and that the flight will not interfere with, or impose a burden on, the operations of operators who have been approved for RVSM operations in accordance with Section 3 of this appendix.

6. Section 6. Reporting Altitude-Keeping Errors

a. Each operator shall report to the Administrator each event in which the operator's aircraft has exhibited the following altitude-keeping performance:

(1) Total vertical error of 300 feet or ore;
(2) Altimety system error of 245 feet or more; or
(3) Assigned altitude deviation of 300 feet or more.

7. Section 7. Removal or Amendment of Authority

a. The Administrator may amend operations specifications or management specifications issued under subpart K of this part to revoke or restrict an RVSM authorization, or may revoke or restrict an RVSM letter of authorization, if the Administrator determines that the operator is not complying, or is unable to comply, with this appendix or subpart H of this part. Examples of reasons for amendment, revocation, ore restriction include, but are not limited to, an operator's:

(1) Committing one or more altitude-keeping errors in RVSM airspace;

(2) Failing to make an effective and timely response to identify and correct an altitude-keeping error; or

(3) Failing to report an altitude-keeping error.

8. Section 8. Airspace Designation

a. RVSM in the North Atlantic. (1) RVSM may be applied in the NAT in the following ICAO Flight Information Regions (FIRs): New York Oceanic, Gander Oceanic, Sondrestrom FIR, Reykjavik Oceanic, Shanwick Oceanic, and Santa Maria Oceanic.

(1) RVSM may be effective in the Minimum Navigation Performance Specification (MNPS) airspace within the NAT. The MNPS airspace within the NAT is defined by the volume of airspace between FL 285 and FL 420 (inclusive) extending between latitude 27 degrees north and the North Pole, bounded in the east by the eastern boundaries of control areas Santa Maria Oceanic, Shanwick Oceanic, and Reykjavik Oceanic and in the west by the western boundaries of control areas Reykjavik Oceanic, Gander Oceanic, and New York Oceanic, excluding the areas west of 60 degrees west and south of 38 degrees 30 minutes north.

b. RVSM in the Pacific. (1) RVSM may be applied in the Pacific in the following ICAO Flight Information Regions (FIRs): Anchorage Arctic, Anchorage Continental, Anchorage Oceanic, Auckland Oceanic, Brisbane, Edmonton, Honiara, Los Angeles, Melbourne, Nadi, Naha, Nauru, New Zealand, Oakland, Oakland Oceanic, Port Moresby, Seattle, Tahiti, Tokyo, Ujung Pandang and Vancouver.

c. RVSM in the West Atlantic Route System (WATRS). RVSM may be applied in the New York FIR portion of the West Atlantic Route System (WATRS). The area is defined as beginning at a point 38°30' N/60°00'W direct to 38°30'N/69°15' W direct to 38°20' N/69°57' W direct to 37°31' N/71°41' W direct to 37°13' N/72°40' W direct to 35°05' N/72°40' W direct to 34°54' N/72°57' W direct to 34°29' N/73°34' W direct to 34°33' N/73°41' W direct to 34°19' N/74°02' W direct to 34°14' N/73°57' W direct to 32°12' N/76°49' W direct to 32°20' N/77°00' W direct to 28°08' N/77°00' W direct to 27°50' N/76°32' W direct to 27°50' N/74°50' W direct to 25°00' N/73°21' W direct to 25°00'05' N/69°13'06' W direct to 25°00' N/69°07' W direct to 23°30' N/68°40' W direct to 23°30' N/60°00' W to the point of beginning.

d. RVSM in the United States. RVSM may be applied in the airspace of the 48 contiguous states, District of Columbia, and Alaska, including that airspace overlying the waters within 12 nautical miles of the coast.

e. RVSM in the Gulf of Mexico. RVSM may be applied in the Gulf of Mexico in the following areas: Gulf of Mexico High Offshore Airspace, Houston Oceanic ICAO FIR and Miami Oceanic ICAO FIR.

f. RVSM in Atlantic High Offshore Airspace and the San Juan FIR. RVSM may be applied in Atlantic High Offshore Airspace and in the San Juan ICAO FIR.

[Doc. No. 28870, 62 FR 17487, Apr. 9, 1997, as amended by Amdt. 91–261, 65 FR 5942, Feb. 7, 2000; Amdt. 91–271, 66 FR 63895, Dec. 10, 2001; Amdt. 91–274, 68 FR 54584, Sept. 17, 2003; Amdt. 91–276, 68 FR 70133, Dec. 17, 2003]

NOTICE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

N7110.391

Cancellation
Date: 11/24/05

SUBJ: DOMESTIC REDUCED VERTICAL SEPARATION MINIMUM (DRVSM)

1. PURPOSE. This notice transmits changes to Federal Aviation Administration (FAA) Order 7110.65P, Air Traffic Control.

2. DISTRIBUTION. This notice is distributed to select offices in Washington headquarters, the regional offices, Mike Monroney Aeronautical Center, and all air traffic field facilities.

3. EFFECTIVE DATE. This notice is effective November 25, 2004, and will remain in effect for 1 year or until the changes are published in FAA Order 7110.65P, whichever occurs first.

4. BACKGROUND. The vertical separation minimum at flight levels 290 thru 410 has been reduced from 2000 feet to 1000 feet within many areas of the world. This reduced vertical separation minimum will also become effective within the domestic United States and specified adjoining airspace on January 20, 2005.

5. PROCEDURES. Amend FAA Order 7110.65P subparagraph a of Paragraph 2-1-7, Inflight Equipment Malfunctions, to read as follows:

2-1-7. Inflight Equipment Malfunctions.

a. When a pilot reports an inflight equipment malfunction, determine the nature and extent of any special handling desired.

NOTE-
Inflight equipment malfunctions include partial or complete failure of equipment, which may affect either safety, ***separation standards,*** *and/or the ability of the flight to proceed under IFR,* ***or in RVSM airspace,*** *in the ATC system. Controllers may expect reports from pilots regarding VOR, TACAN, ADF, GPS,* ***RVSM capability,*** *or low frequency navigation receivers, impairment of air-ground communications capability, or other equipment deemed appropriate by the pilot (e.g. airborne weather radar). Pilots should communicate the nature and extent of any assistance desired from ATC.*

Add paragraph 2-1-28, RVSM Operations, to read as follows:

2-1-28. RVSM Operations.

Controller responsibilities shall include but not be limited to the following:

a. Notify operations supervisor/controller-in-charge of any non-RVSM aircraft requesting access to RVSM airspace.

b. Ensure non-RVSM aircraft are not permitted in RVSM airspace unless they meet the criteria of excepted aircraft and are previously approved by the operations supervisor/ controller-in-charge or supervisory traffic management coordinator/coordinator-in-charge. The following aircraft are excepted: DoD, Lifeguard, manufacturer aircraft being flown for development/certification, Foreign State aircraft, and aircraft transitioning through RVSM airspace. These exceptions are accommodated on a workload or traffic-permitting basis.

NOTE-
The operations supervisor and the STMC/CIC are responsible for system acceptance of a non-RVSM aircraft beyond the initial sector to sector coordination following the pilot request to access the airspace. Operations supervisor and STMC/CIC responsibilities are defined in FAA Order 7210.3, Chapter 6, Section 9, Reduced Vertical Separation Minimum (RVSM).

c. Ensure sector-to-sector coordination for all non-RVSM aircraft operations within RVSM airspace.

d. Apply appropriate separation standards and remove any aircraft from RVSM airspace that advises it is unable RVSM due to equipment while en route.

e. Use "negative RVSM" in all verbal ground-to-ground communications involving non-RVSM aircraft while cleared to operate within RVSM airspace.

EXAMPLE-
"Point out Baxter21 climbing to FL360, negative RVSM."

f. For the following situations, use the associated phraseology:

1. To ascertain the RVSM approval status of an aircraft.

PHRASEOLOGY-
"CONFIRM RVSM APPROVED."

2. To deny clearance into RVSM airspace.

PHRASEOLOGY-
"UNABLE CLEARANCE INTO RVSM AIRSPACE."

3. To request a pilot to report when able to resume RVSM.

PHRASEOLOGY-
"REPORT ABLE TO RESUME RVSM."

g. Amend the equipment suffix as appropriate whenever an error or airborne event has changed the aircraft's navigational capabilities in order to properly identify non-RVSM aircraft on the controller display."

Amend TBL 2-2-3, Aircraft Equipment Suffixes, of Paragraph 2-3-7, Aircraft Equipment Suffix, to read as follows:

TBL 2-3-3

Aircraft Equipment Suffixes

Suffix	Aircraft Equipment Suffixes
	NO DME
/X	No transponder
/T	Transponder with no Mode C
/U	Transponder with Mode C
	DME
/D	No transponder
/B	Transponder with no Mode C
/A	Transponder with Mode C
	TACAN ONLY
/M	No transponder
/N	Transponder with no Mode C
/P	Transponder with Mode C
	AREA NAVIGATION (RNAV)
/Y	LORAN, VOR/DME, or INS with no transponder
/C	LORAN, VOR/DME, or INS, transponder with no Mode C
/I	LORAN, VOR/DME, or INS, transponder with Mode C
	ADVANCED RNAV WITH TRANSPONDER AND MODE C (If an aircraft is unable to operate with a transponder and/or Mode C, it will revert to the appropriate code listed above under Area Navigation.)
/E	Flight Management System (FMS) with en route, terminal, and approach capability. Equipment requirements are: (a) Dual FMS which meets the specifications of AC 25-15, Approval of Flight Management Systems in Transport Category Airplanes; AC 20-129, Airworthiness Approval of Vertical Navigation (VNAV) Systems for use in the U.S. NAS and Alaska; AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors; or equivalent criteria as approved by Flight Standards. (b) A flight director and autopilot control system capable of following the lateral and vertical FMS flight path. (c) At least dual inertial reference units (IRUs). (d) A database containing the waypoints and speed/altitude constraints for the route and/or procedure to be flown that is automatically loaded into the FMS flight plan. (e) An electronic map. (U.S. and U.S. territories only unless otherwise authorized.)
/F	FMS with en route, terminal, and approach capability. Unless otherwise authorized by the Administrator, equipment requirements are:

	(a) Single FMS which meets the specifications of AC 25-15, Approval of Flight Management Systems in Transport Category Airplanes; AC 20-129, Airworthiness Approval of Vertical Navigation (VNAV) Systems for use in the U.S. NAS and Alaska; AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors; or equivalent criteria as approved by Flight Standards. (b) A demonstrated capability of depicting and following the lateral and vertical path. (c) An FMS with DME/DME updating and one or more of the following: Single Global Positioning System (GPS) - Single inertial reference unit (IRU). (d) A database containing the waypoints and speed/altitude constraints for the route and/or procedure to be flown that is automatically loaded into the FMS flight plan. (U.S. and U.S. territories only unless otherwise authorized.)
/G	Global Navigation Satellite System (GNSS)**, including GPS or WAAS,** with en route and terminal capability.
/R	Required Navigational Performance. **The aircraft meets the RNP type prescribed for the route segment(s), route(s) and/or area concerned.**
	Reduced Vertical Separation Minimum (RVSM). Prior to conducting RVSM operations within the U.S., the operator must obtain authorization from the FAA or from the responsible authority, as appropriate.
/Q	**RVSM with /E, /F, /G, or /R capability, except aircraft operating in Oakland Oceanic or Anchorage Oceanic CTA/FIRs must be RVSM with /R capability.**
/W	**RVSM**

Amend subparagraphs a and b, and add subparagraph c of Paragraph 4-5-1, Vertical Separation Minima, to read as follows:

Separate instrument flight rules (IFR) aircraft using the following minima between altitudes:

a. Up to and including **FL 410**- 1,000 feet.

b. Apply 2,000 feet at or above FL 290 between Non-RVSM aircraft and all other aircraft at or above FL 290.

NOTE-
Aircraft operating in a formation flight are considered Non-RVSM aircraft regardless of their single-ship status.

REFERENCE-
FAAO 7110.65, Formation Flights, Para 2-1-13.
FAAO 7110.65, Additional Separation for Formation Flights, Para 5-5-8.
P/CG Term – Formation Flight.

c. Above FL 410- 2,000 feet except:

1. In oceanic airspace, above FL 450 between a supersonic and any other aircraft – 4,000 feet.

2. Above FL 600 between military aircraft – 5,000 feet.

NOTE-
Oceanic separation procedures are supplemented in Chapter 8; Section 7, Section 8, Section 9, and Section 10.

REFERENCE-
FAAO 7110.65, Vertical Application, Para 5-5-5.
FAAO 7110.65, Application, Para 6-6-1.
FAAO 7110.65, Military Operations Above FL 600, Para 9-3-13.

Amend Paragraph 4-5-3, Exceptions, to read as follows:

"When traffic, meteorological conditions or aircraft operational limitations prevent assignment of altitudes prescribed in para 4-5-2, Flight Direction, assign any cardinal altitude or flight level below FL **410** or any odd cardinal flight level at or above FL **410** without regard to direction of flight as follows:

NOTE-
Same.

Amend subparagraphs c and d, and add subparagraph e of Paragraph 5-1-8, Merging Target Procedures, to read as follows:

c. When both aircraft in subpara b are in RVSM airspace, and vertically separated by 1,000 feet, if either pilot reports they are unable to maintain RVSM due to turbulence or mountain wave, vector either aircraft to avoid merging with the target of the other aircraft.

EXAMPLE-
"Delta One Twenty Three, fly heading two niner zero, vector for traffic. Traffic twelve o'clock, one zero miles, opposite direction, MD-80 eastbound at flight level three two zero."

d. If the pilot requests, vector his/her aircraft to avoid merging with the target of previously issued traffic.

NOTE-
Aircraft closure rates are so rapid that when applying merging target procedures, controller issuance of traffic must be commenced in ample time for the pilot to decide if a vector is necessary.

e. If unable to provide a vector, inform the pilot."

Note-
The phraseology "Unable RVSM due turbulence (or mountain wave)" is only intended for severe turbulence or other weather encounters with significant altitude deviations of approximately 200 feet or more.

Amend subparagraph c of Paragraph 5-5-8, Additional Separation for Formation Flights, to read as follows:

c. Separate a nonstandard formation flight by applying the appropriate separation minima to the perimeter of the airspace encompassing the nonstandard formation or from the outermost aircraft of the nonstandard formation whichever applies.

NOTE-
Aircraft operating in a formation flight are considered Non-RVSM aircraft regardless of their single-ship status.

REFERENCE-
FAAO 7110.65, Vertical Separation Minima, Para 4-5-1.

Amend subparagraph a of Paragraph 9-5-4, Separation Minima, to read as follows:

a. IFR aircraft by one of the following:

1. *1,000 feet* above it**; or in accordance with para 4-5-1, Vertical Separation Minima, whichever is greater.**

2. 2,000 feet below it.

3. 5 miles radar.

4. 5 miles laterally.

Michael A. Cirillo
Vice President, System Operations Services

NOTICE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

N7110.392

Cancellation
Date: 11/24/05

SUBJ: DOMESTIC REDUCED VERTICAL SEPARATION MINIMUM (DRVSM)

1. PURPOSE. This notice transmits changes to Federal Aviation Administration (FAA) Order 7110.10R, Flight Services.

2. DISTRIBUTION. This notice is distributed to select offices in Washington headquarters, the regional offices, Mike Monroney Aeronautical Center, and all air traffic field facilities.

3. EFFECTIVE DATE. This notice is effective November 25, 2004, and will remain in effect for 1 year or until the changes are published in FAA Order 7110.10R, whichever occurs first.

4. BACKGROUND. The vertical separation minimum at flight levels 290 thru 410 has been reduced from 2000 feet to 1000 feet within many areas of the world. This reduced vertical separation minimum will also become effective within the domestic United States and specified adjoining airspace on January 20, 2005.

5. PROCEDURES. Amend TBL 6-2-3, Aircraft Equipment Suffixes, of Paragraph 6-2-1, Flight Plan Recording, to read as follows:

TBL 6-2-3

Aircraft Equipment Suffixes

Suffix	Aircraft Equipment Suffixes
	NO DME
/X	No transponder
/T	Transponder with no Mode C
/U	Transponder with Mode C
	DME
/D	No transponder
/B	Transponder with no Mode C
/A	Transponder with Mode C

	TACAN ONLY
/M	No transponder
/N	Transponder with no Mode C
/P	Transponder with Mode C
	AREA NAVIGATION (RNAV)
/Y	LORAN, VOR/DME, or INS with no transponder
/C	LORAN, VOR/DME, or INS, transponder with no Mode C
/I	LORAN, VOR/DME, or INS, transponder with Mode C
	ADVANCED RNAV WITH TRANSPONDER AND MODE C (If an aircraft is unable to operate with a transponder and/or Mode C, it will revert to the appropriate code listed above under Area Navigation.)
/E	Flight Management System (FMS) with en route, terminal, and approach capability. Equipment requirements are: (a) Dual FMS which meets the specifications of AC 25-15, Approval of Flight Management Systems in Transport Category Airplanes; AC 20-129, Airworthiness Approval of Vertical Navigation (VNAV) Systems for use in the U.S. NAS and Alaska; AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors; or equivalent criteria as approved by Flight Standards. (b) A flight director and autopilot control system capable of following the lateral and vertical FMS flight path. (c) At least dual inertial reference units (IRUs). (d) A database containing the waypoints and speed/altitude constraints for the route and/or procedure to be flown that is automatically loaded into the FMS flight plan. (e) An electronic map. (U.S. and U.S. territories only unless otherwise authorized.)
/F	FMS with en route, terminal, and approach capability. Unless otherwise authorized by the Administrator, equipment requirements are: (a) Single FMS which meets the specifications of AC 25-15, Approval of Flight Management Systems in Transport Category Airplanes; AC 20-129, Airworthiness Approval of Vertical Navigation (VNAV) Systems for use in the U.S. NAS and Alaska; AC 20-130A, Airworthiness Approval of Navigation or Flight Management Systems Integrating Multiple Navigation Sensors; or equivalent criteria as approved by Flight Standards. (b) A demonstrated capability of depicting and following the lateral and vertical path. (c) An FMS with DME/DME updating and one or more of the following: Single Global Positioning System (GPS) - Single inertial reference unit (IRU). (d) A database containing the waypoints and speed/altitude constraints for the route and/or procedure to be flown that is automatically loaded into the FMS flight plan. (U.S. and U.S. territories only unless otherwise authorized.)
/G	Global Navigation Satellite System (GNSS)**, including GPS or WAAS,** with en route and terminal capability.
/R	Required Navigational Performance. **The aircraft meets the RNP type prescribed for the route segment(s), route(s) and/or area concerned.**
	Reduced Vertical Separation Minimum (RVSM). Prior to conducting RVSM operations within the U.S., the operator must obtain authorization from the FAA or from the responsible authority, as appropriate.
/Q	**RVSM with /E, /F, /G, or /R capability, except aircraft operating in Oakland Oceanic or Anchorage Oceanic CTA/FIRs must be RVSM with /R capability.**

/W	**RVSM**

Michael A. Cirillo
Vice President, System Operations Services

NOTICE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

N7210.590

Cancellation
Date: 11/24/05

SUBJ: DOMESTIC REDUCED VERTICAL SEPARATION MINIMUM (DRVSM)

1. PURPOSE. This notice transmits changes to Federal Aviation Administration (FAA) Order 7210.3T, Facility Operation and Administration.

2. DISTRIBUTION. This notice is distributed to select offices in Washington headquarters, the regional offices, Mike Monroney Aeronautical Center, and all air traffic field facilities.

3. EFFECTIVE DATE. This notice is effective November 25, 2004, and will remain in effect for 1 year or until the changes are published in FAA Order 7210.3T, whichever occurs first.

4. BACKGROUND. The vertical separation minimum at flight levels 290 thru 410 has been reduced from 2000 feet to 1000 feet within many areas of the world. This reduced vertical separation minimum will also become effective within the domestic United States and specified adjoining airspace on January 20, 2005.

5. PROCEDURES.

a. Amend FAA Order 7210.3T, Paragraph 2-2-3, Duty Familiarization and the Transfer of Position Responsibility, to read as follows:

a. thru b.1.(a)(13) ***NOTE-*** No Change

Add:

(14) Non-RVSM approved aircraft operations.

(15) TRAFFIC.

No further changes to paragraph.

Add Section 9 to Chapter 6, En Route Operations and Services, to read as follows:

Section 9. Reduced Vertical Separation Minimum (RVSM)

6-9-1. GENERAL

a. RVSM reduces the standard separation between FL290 and FL410 from 2,000 feet to 1,000 feet for those aircraft approved for operation within these altitude strata. The six additional

altitudes provide the users fuel savings and operational efficiencies while providing ATC flexibility, mitigation of conflict points, enhanced sector throughput and reduced controller workload for air traffic control operations.

b. RVSM is applied in that airspace from FL290 through FL410 over the domestic United States, Alaska, the Gulf of Mexico where the FAA provides air traffic services, the San Juan FIR, across international borders with Canada and Mexico, and the Pacific and Atlantic Oceanic airspace controlled by the FAA. There are two forms of RVSM airspace:

1. RVSM Airspace. Use of the term RVSM airspace refers to the RVSM exclusive environment. Aircraft operating in this airspace must be RVSM approved.

NOTE-
1. ***The following non-RVSM aircraft are exceptions to the exclusive RVSM airspace however, access will be on a workload-permitting basis:***

a. DoD aircraft.

b. Lifeguard aircraft.

c. Aircraft being flown by manufacturers for development and certification.

d. Foreign State aircraft.

2. ***Aircraft not approved for RVSM operations may transition through RVSM airspace to operate above or below.***

2. Transition Airspace. Airspace where both RVSM aircraft and non-RVSM aircraft may be accommodated at all altitudes and RVSM approval is not required. Transition airspace connects airspace wherein conventional separation is applied to RVSM airspace. One thousand feet vertical separation can only be applied between RVSM aircraft. Two thousand feet separation must be applied between non-RVSM aircraft or whenever one of the aircraft is non-RVSM.

6-9-2. FACILITY MANAGER RESPONSIBILITIES

a. Ensure all facility directives are current to support RVSM.

b. Ensure all LOAs, SOPs, MOUs and Sector Position Binders are current to support RVSM.

c. Ensure airspace is continually reviewed for impact of RVSM.

d. Ensure all height deviations of 300 feet or more are recorded and forwarded to the FAA Technical Center in Atlantic City, New Jersey at NAARMO@faa.gov.

REFERENCE-
FAAO 7210.56, para 4-1-9, Invalid Mode C Reporting

6-9-3. OPERATIONS MANAGER-IN-CHARGE RESPONSIBILITIES

Responsibilities shall include but not be limited to the following:

a. Maintain an operational awareness of RVSM impact specifically any non-RVSM aircraft being worked within RVSM airspace.

b. Ensure proper coordination is accomplished between the STMC/TMU and the operations supervisors/controllers-in-charge regarding the accommodation and handling of any non-RVSM aircraft.

c. Ensure, in conjunction with the Traffic Management Officer, that monitor alert values are addressed with RVSM impacts considered.

d. Ensure the proper RVSM software is turned on.

6-9-4. OPERATIONS SUPERVISOR-IN-CHARGE/CONTROLLER-IN-CHARGE RESPONSIBILITIES

Responsibilities shall include but not be limited to the following:

a. Maintain an awareness of all operational impacts associated with RVSM, specifically any non-RVSM aircraft currently within area sectors or projected to be in sectors under his/her area of responsibility.

b. Ensure sector personnel have been properly briefed regarding any known non-RVSM aircraft in or projected to be in sectors under his/her area of responsibility.

c. Ensure sector workload remains manageable when non-RVSM aircraft are in or projected to be in sectors under his/her area of responsibility.

d. Coordinate all non-RVSM aircraft with the STMC/TMU and other operational supervisors as appropriate, both internally and externally, to ensure the aircraft is coordinated and accepted along its route of flight.

e. Ensure controllers at applicable sectors have their DSR MDM properly aligned to display the RVSM indicator depicting those aircraft that are non-RVSM.

6-9-5. NON-RVSM OPERATOR COORDINATION REQUIREMENTS

a. RVSM approval is required for aircraft to operate within RVSM airspace. The operator must determine that the appropriate State authority has approved the aircraft.

b. DoD, Lifeguard, aircraft operated by manufacturers for certification and development, Foreign State aircraft, and non-RVSM aircraft requesting to operate above RVSM airspace will be handled on a workload permitting basis. Operators of these aircraft may pre-coordinate with the local ARTCC wherein the flight will operate. Should the needs of the flight involve more than two ARTCCs, the operator will contact the ATCSCC for assistance with the coordination process.

c. The ATCSCC, TMU, and the operational supervisors/controllers-in-charge shall ensure coordination is accomplished to provide continuity of service to the aircraft.

6-9-6. EQUIPMENT SUFFIX AND DISPLAY MANAGEMENT

RVSM aircraft will file the equipment suffix “W” or “Q”. NAS automation has been modified to reflect non-RVSM aircraft with a coral box around the fourth character in the altitude segment of the data block. Conflict alert parameters will distinguish between RVSM and non-RVSM aircraft based upon the “W” or “Q” suffix for the appropriate separation standard to be applied.

6-9-7. MOUNTAIN WAVE ACTIVITY (MWA)

In areas of known MWA, aircraft operators have been encouraged to report encountering this weather event and the severity of its impact. Operators may request assistance in the form of reroutes, change of altitude, vectors, or merging target procedures.

6-9-8. WAKE TURBULENCE AND WEATHER RELATED TURBULENCE

a. *Oceanic:* Aircraft experiencing turbulence can be anticipated to advise ATC and request a revised clearance. In instances where a revised clearance is not possible or practicable the aircraft may fly a lateral offset not to exceed 2NM from the assigned route or track, advise ATC as soon as practical and return to the assigned route when the offset is no longer required.

b. *Domestic:* Aircraft experiencing turbulence can be anticipated to advise ATC and request a clearance for mitigation in the form of vectors, altitude change or to fly an offset.

6-9-9. SUSPENSION OF RVSM

a. *Domestic:* RVSM will not be suspended in domestic airspace. Should turbulence or other weather phenomena require, separation can be increased in a defined area and thoroughly coordinated operationally.

b. *Oceanic:* Air Traffic Service providers will consider suspending RVSM procedures within affected areas when pilot reports of greater than moderate turbulence are received. Within airspace where RVSM procedures are suspended, the vertical separation minimum between all aircraft will be 2,000 feet above FL290.

Michael A. Cirillo
Vice President, System Operations Services

NOTICE

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION

N 7210.588

Cancellation
Date: 1/19/06

SUBJ: TRAFFIC MANAGEMENT (TM) SUPPORT OF NON-REDUCED VERTICAL SEPARATION MINIMA (RVSM) AIRCRAFT OPERATING IN RVSM AIRSPACE

1. PURPOSE. To provide supplemental guidance on managing Non-RVSM aircraft requesting and/or operating in RVSM airspace.

2 DISTRIBUTION. This notice is distributed to select offices in Washington headquarters, regional offices, the William J. Hughes Technical Center, the Mike Monroney Aeronautical Center, select Air Traffic field facilities, international aviation field offices and interested aviation public.

3. EFFECTIVE DATE. This notice is effective January 20, 2005.

4. BACKGROUND. On January 20, 2005, the United States will commence RVSM operations on a national basis. In addition, some Air Traffic Control (ATC) providers whose airspace abuts domestic US airspace will also commence RVSM operations. Additional procedures will be required to accommodate Non-RVSM aircraft in RVSM airspace.

5. POLICY. In accordance with Title 14 of the Code of Federal Regulations, Section 91.180, domestic RVSM airspace (Flight Level (FL) 290-410) is exclusionary airspace. With only limited exceptions, all operators and individual aircraft must have received RVSM authorization from the Federal Aviation Administration (FAA) to operate at RVSM altitudes. If an aircraft or its operator has not been authorized for RVSM operations, the aircraft will be referred to as a "Non-RVSM" aircraft. Excepted Non-RVSM aircraft will be granted access to RVSM altitudes on a workload permitting basis. Two categories of excepted Non-RVSM aircraft have been established. These are Pre-Coordinated flights and File-and-Fly flights. Priority in RVSM airspace will be afforded to RVSM compliant flights, then Pre-coordinated flights, and then File-and-Fly flights.

6. DEFINITIONS:

a. Pre-coordinated: Flights that contact the FAA between 60-240 minutes prior to their proposed departure time that are Non-RVSM certified and request access to RVSM airspace and have received a conditional approval from the FAA.

b. File-and-Fly: Operators of excepted Non-RVSM flights requesting access to RVSM airspace may file a flight plan without pre-coordination. This flight plan will serve as the notification to the FAA of the operator's intention to request to access RVSM airspace. In addition, operators contacting the FAA less than 60 minutes prior to departure will be handled as File-and-Fly flights.

c. Conditional Approval: A tentative approval from the FAA for a Non-RVSM aircraft to expect clearance into RVSM airspace. It is based on an estimate of the conditions expected at the time of the Non-RVSM aircraft entering RVSM airspace. Clearance into the airspace will be on a workload and traffic-permitting basis.

d. Denial: A negative response to a Non-RVSM customer's request to enter RVSM airspace.

e. Entry Facility (EF): Facility where an aircraft penetrates US domestic RVSM airspace.

f. Exit Facility (XF): Facility where an aircraft departs US domestic RVSM airspace and remains clear of US domestic RVSM airspace for the remainder of the flight.

g. RVSM Facility: Air Traffic facility that provides air traffic services in RVSM airspace.

7. **EXCEPTED FLIGHTS:** Under the authority granted in 14 CFR 91.180, the Administrator has determined that the following groups of Non-RVSM aircraft may enter RVSM airspace subject to FAA approval and clearance:

a. Department of Defense aircraft;

b. Foreign State (government) aircraft;

c. Active air ambulance utilizing a "Lifeguard" call sign;

d. Flights conducted for aircraft certification and development flights for RVSM;

e. Aircraft climbing/descending through RVSM airspace without leveling at RVSM altitudes.

1. **8. OPERATOR ACCESS OPTIONS:** Operators of excepted Non-RVSM aircraft requesting access to DRVSM airspace have the following options available to them:

a. Complies with a Letter of Agreement (LOA)/Memorandum of Understanding (MOU) for operations within a single or adjacent ARTCCs.

b. File-and-Fly:

(1) Files a flight plan and makes the initial request to access RVSM airspace by requesting an ATC clearance, or;

(2) Notifies the FAA via telephone less than 60-minutes prior departure, or;

(3) Requests an ATC clearance for all flights in 7e, above.

c. Pre-Coordinated: Submits a request to access RVSM airspace via a specified method 60-240 minutes prior to proposed departure time and receives a conditional approval from the approving authority.

Note: For Pre-Coordinated flights, the operator may file a flight plan prior to notifying the FAA. In addition, facsimile machines (fax) and the Internet may be used to supplement the telephonic coordination. This could expedite the Conditional Approval process.

9. PHRASEOLOGY FOR PRE-COORDINATED FLIGHTS: All facilities must use the following phraseology when responding to an operator's request:

"Your RVSM request is…

a. Conditionally approved as requested.”

b. Conditionally approved subject to the following changes...”

c. Denied.”

10. PROCEDURES.

a. Single Facility.

(1) Pre-Coordinated flights:

(a) The operator contacts the facility TMU for Pre-Coordinated conditional approval;

(b) The TMU documents the request;

(c) The TMU coordinates the request in accordance with the facility SOP;

(d) The TMU documents the decision, and issues a response to the requestor.

(2) File-and-Fly flights:

(a) The operator requests a clearance into RVSM airspace;

(b) If workload permits, the flight is accommodated;

(c) Coordination is completed in accordance with the facility SOP;

(d) LOA / MOU flights: These flights are coordinated and conducted within the guidelines of the LOA / MOU and the facility SOP.

b. Two Facilities.

(1) Pre-Coordinated flights:

(a) The operator contacts the departure RVSM facility TMU for a Pre-Coordinated conditional approval;

(b) The departure RVSM facility TMU documents the request;

(c) The departure RVSM facility TMU coordinates the request in accordance with the facility SOP; and coordinates the request with the impacted adjacent facility or sectors as appropriate;

(d) The departure RVSM facility TMU documents the decision, and issues a response to the requestor.

(2) File-and-Fly flights:

(a) The operator requests a clearance into RVSM airspace;

(b) If workload permits, the flight is accommodated;

(c) Coordination is completed in accordance with the facility SOP.

c. Three Facilities or more.

Pre-Coordinated flights:

(a) The operator contacts the ATCSCC for a Pre-Coordination conditional approval;

(b) The ATCSCC documents the request and contacts the appropriate facility TMUs for a conditional approval or denial. The documentation of the request must be at the web site www.fly.faa.gov or in the NTML;

(c) The facility TMUs coordinate internally in accordance with facility SOP;

(d) The facility TMUs respond and the ATCSCC documents the facilities input;

(e) (Optional) If one or more of the facilities recommends a change, the ATCSCC convenes a telephone conference with the appropriate parties to work towards a resolution;

(f) The ATCSCC notifies the facilities and the customer of the disposition of the request and enters it in the log;

(g) The facility TMUs conduct internal notification in accordance with the facility SOP.

(2) File-and-Fly flights:

(a) The operator contacts the facility to request a clearance into RVSM airspace;

(b) If workload permits, the flight is accommodated;

(c) Coordination is completed in accordance with the facility SOP.

(d) International Flights.

(1) Flights Inbound to US:

(a) The Entry Facility (EF) receives the request for access to RVSM airspace directly from an international point of contact (POC);

(b) The EF documents and coordinates flights that will impact only their facility or theirs and an adjacent facility;

(c) If the flight will impact three or more facilities, the EF contacts the ATCSCC;

(d) The ATCSCC documents the request and coordinates with all impacted facilities, and informs all impacted facilities of the disposition of the request;

(e) The EF relays the information to the originating facility.

(2) Flights Outbound from the US:

(a) The ATCSCC receives the request from the customer and coordinates it with the impacted facilities;

(b) ATCSCC relays the pre-coordinated flight to the XF;

(c) The Exit Facility (XF) coordinates with the international point-of-contact.

e. Changes for a Pre-Coordinated Flight.

(1) ATC initiated route changes:

(a) In a single center; comply with SOP;

(b) If the route change affects another facility, notify the TMU and the TMU coordinates with the affected facility;

(c) If three or more facilities are impacted, the ATCSCC is notified by the TMU at the facility initiating the reroute;

(d) The ATCSCC must coordinate with the remaining facilities and document the information.

(2) Pilot initiated route changes other than minor deviations for weather avoidance:

(a) When a pilot requests a route change; the flight will revert to File-and-Fly status and be handled accordingly;

(b) When a flight reverts to File-and-Fly status, the TMU must be notified;

(c) If two facilities or less are impacted, the coordination is accomplished by the TMU of the facility receiving the request, and entered into the log;

(d) If three or more facilities are impacted, the ATCSCC is notified by the TMU of the facility receiving the request and the ATCSCC must coordinate with the remaining facilities and enter the information into the log.

(3) ATC initiated altitude changes are handled in accordance with FAA Order 7110.65 and facility SOP.

(4) Pilot initiated altitude changes:

(a) Flight reverts to File-and-Fly status;

(b) TMU is notified of the change;

(c) TMU coordinates with the adjacent facility or ATCSCC, as appropriate.

11. RESPONSIBLITIES

a. The ATCSCC must:

(1) Facilitate pre-coordinated requests for access to RVSM airspace when the Non-RVSM flight will traverse three or more facilities;

(2) Document pre-coordinated requests for flights that traverse three or more RVSM facilities, with the following information:

(a) Aircraft identification;

(b) Proposed departure time;

(c) Speed;

(d) Altitude;

(e) Route of flight;

(f) Customer name and contact information;

(g) Comments germane to the flight (Optional).

Note: Non-RVSM requests must be documented and coordinated utilizing the National Traffic Management Log (NTML) or in the Non-RVSM web page at www.fly.faa.gov.

(3) Document all decisions concerning pre-coordinated Non-RVSM flights in the NTML, including the call sign and whether the flight was approved, or disapproved;

(4) Coordinate with appropriate facilities;

Note: The ATCSCC may deny the request without coordinating with any facility. The denial must include a reason in the documentation.

(5) Facilitate alternative resolutions, if practicable;

(6) Document decisions;

(7) Inform facilities of the decision;

(8) Inform the customer of the decision, and any associated instructions;

(9) Maintain a database of requests and associated decisions for analysis;

(10) Re-coordinate flights when informed by a facility that it will not be able to accommodate the Pre-coordinated Non-RVSM aircraft, or change the route from the original conditional approval;

(11) Utilize the traffic situation display (TSD) in decision-making about Non-RVSM flights;

(12) Maintain at a minimum, a dedicated phone line for Non-RVSM requests. The Internet may supplement the phone line.

b. Facilities with RVSM airspace must:

(1) Provide guidance in the facility Standard Operating Procedure (SOP) for managing Non-RVSM flights. The SOP must contain at a minimum, the following information:

(a) Coordination and notification requirements for Operational Supervisors, Controllers- in-Charge (CIC), and certified professional controllers, when a Non-RVSM flight is conditionally approved;

(b) Coordination and notification process when a Pre-Coordinated Non-RVSM aircraft can no longer be accommodated in RVSM altitudes;

(c) Coordination process for Non-RVSM aircraft operating above RVSM airspace to descend through RVSM airspace.

(2) Where available, display the Center Monitor on the Traffic Situation Display in each area and the TMU. This will aid in the coordination and decision making process for approving Non-RVSM flights.

(c) Traffic Management Units (TMU) in facilities with RVSM airspace must:

(1) Facilitate Pre-Coordinated requests for access to RVSM airspace when the Non-RVSM flight will traverse no more than two RVSM facilities;

(2) Document Pre-coordinated requests (that are not documented at the **www.fly.faa.gov** website) in the NTML, if available, for flights that originate in their airspace and do not traverse more than two RVSM facilities, with the following information:

(a) Aircraft identification;

(b) Proposed departure time;

(c) Speed;

(d) Altitude;

(e) Route of flight;

(f) Customer name and contact information;

(g) Comments germane to flight (Optional).

(3) Document all decisions concerning pre-coordinated Non-RVSM flights in the NTML, including the call sign and whether the flight was approved, or disapproved;

(4) Inform the customer of the decision, and any associated instructions;

(5) Maintain a database of internal requests and associated decisions for analysis;

(6) Monitor, assess, and act on the information in the TSD to evaluate the facility’s ability to manage Non-RVSM aircraft;

(7) Forward user requests to the ATCSCC, if the Non-RVSM flight traverses more than two facilities;

(8) Approve or disapprove user requests forwarded by the ATCSCC. All requests that are disapproved must be justified, e.g. traffic, complexity, workload, etc;

(9) Notify the ATCSCC and/or adjacent facility, as appropriate, when the aircraft will not be able to continue on the previously coordinated route in RVSM airspace. Document the information in the appropriate log;

(10) If located in an EF/XF, acts as point of contact for international Non-RVSM requests.

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